UCLA Curtis Center Conference
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Mary Sirody
UCLA Site Director
msirody@math.ucla.edu
(310)825-0798
(805)358-0920

For Shipping and Scoring Information:
Susan Dennert
mdtp@ucla.edu
(310) 825-9477
Intro to MDTP

Who, what, where, when, how, why
About MDTP

- Founded in 1977

- Create low-stakes, diagnostic tests of student readiness for courses from Pre-Algebra to Calculus

- MDTP tests and services are aimed at helping teachers pinpoint their students' strengths and weaknesses in mathematics and to use that information to improve teaching and learning
The MDTP Organization

- Project partners: California State University, University of California and the California Academic Partnership Program
- The workgroup writes materials and sets policy
- Ten CSU or UC sites, staffed by Site Directors and administrative personnel, serve local secondary schools
Some MDTP Services

- Develop and field test materials
- Provide materials and scoring of tests
- Detailed diagnostic reports
- Professional development at school sites around appropriate use of materials as well as interpreting and responding to results
- User’s conferences and workshops focused on best uses of MDTP diagnostic tests and current issues in mathematics education
- Collaborate with other math ed groups

No charge to California schools
Test Development

Test development has about a 10 year cycle: develop/update test items, field test, revise, publish

- What are the most important concepts students need proficiency in to demonstrate their readiness for ____?
- What are common misunderstandings / misconceptions?
- What information do teachers and students need to improve teaching and learning?
- Do the results of these test items reflect student classroom outcomes?
Intro to Tests and Analysis of Results

- Results Report: Compiled and presented to allow teachers to glean information about the strengths and weakness of their
  Course
  Classes
  Students
  MDTP-Daskala Demo
Algebra Readiness

What are the most important concepts students need proficiency in to demonstrate their readiness for Algebra?
Essential Questions for MDTP Data Analysis

- What are my students’ mathematical strengths and weaknesses?
- What are my course strengths and weaknesses?
- How can I use the results of testing to inform my instruction?
- How can I use this information to motivate articulation discussions?
- How can my department use MDTP results to motivate collaboration?
Formative Assessment

- Formative assessment has been shown to raise the achievement of all students. In fact, it has been shown to create gains in student learning which are larger than those typically associated with other educational interventions.
  
  - Black and Wiliam, *Inside the Black Box*, 1998

- Mandatory MDTP testing boosts scores on the CST math test enough to move students up several percentile points. For instance the median student (who ranked at the 50th percentile) in one year rises to somewhere between the 54.6th and the 57th percentile….Compared to other types of interventions, these are strong and noteworthy gains.
  
  - Julian Betts, Public Policy Institute of Ca, Oct 2011
Perpetuity

- See doc
  Perpetuated Fraction Difficulties.docx
- How do you respond to this?
Instructional Considerations

We know that doing more of the same won’t work.

- Work with colleagues to develop departmental goals/appropriate activities/instructional adaptations
- Develop fresh instructional strategies
  - Search out resources that give your students new tools to further their understanding: multiple representations, context, connections, class discourse, focus on conceptual understanding rather than memorization of procedures (sense making). Consider MDTP-WRI
- Reassess to confirm students made gains
- Repeat
When to test
Data Driven Instruction:
At Year Start

- To establish a baseline and guide review

- Administer the next “lower” test to glean more data if weaknesses shown in a number of topic areas

- Teach to address misconceptions

- Create tutorial sessions geared to weak topics

- Create opportunities for peer instruction

- Involve students in analysis of their student letter
Data Driven Instruction: During Year

- Measure progress towards understanding of particular topic areas
- Re-evaluate instructional goals and methods
- Measure student progress in current course material with readiness test for next course
- Diagnose areas of weakness as standardized testing dates approach
- Share results with other teachers to guide departmental dialogue
Data Driven Instruction: At Year End

- Use as post test
  - Share gains with students
  - Evaluate remedial instructional effectiveness

- Give readiness test for next course
  - Review curricular strengths and weaknesses
  - Prepare summer packet
  - Target summer remediation efforts
Ordering Materials
Remediation/Enrichment Programs
- Give students their individual reports and direct them to appropriate resources that will help them strengthen their knowledge in weak areas.
- Get together with other teachers at your site to determine common needs and plan strategies to assist students in topics showing weaknesses.
- Devote some time each week to reviewing weak areas (daily warm-ups are often helpful or clustering students according to topics that need strengthening)
- If an entire class shows several weak topics, focus on one topic for initial strengthening then move on as students improve. Choose topics that are related.
- Consider tutorial sessions or an after-school tutoring center. Use the MDTP results to train tutors about student needs and how to respond to student questions.
- Discuss curricular modifications or revised teaching strategies to prevent recurrence of common weaknesses.
- Use an appropriate MDTP Written Response Item to look more closely at student understanding of a topic.

Prepare Students to Take Test
- Inform students of the purpose of the test. It is a diagnostic test, not an achievement test and is designed to identify student’s strengths and weaknesses so you can help them improve. Encourage them NOT to guess as it distorts the diagnostic information.
- Have students fill out answer sheets on a day before the test is administered.
- Caution students on importance of careful bubbling

Students Take Test
- The test should take approximately 45 minutes but it is not a timed test.
- Encourage students to work out problems on paper and then make a selection. (collect work)
- You will get the best diagnostic information if you give the students as much time as they need.

Send Completed Tests to UCLA Site for Scoring
- For each class, make sure to send in results for the entire class together with a completed Class Information Bubble Sheet.
- It is most efficient to bundle and mail together tests from all teachers in your school
- Tests are generally scored and mailed within 1 day from time of receipt and then sent UPS ground which usually takes 1 day

Evaluation of Results
- A wealth of information is contained in the MDTP Results Report. Suggestions to help you interpret your report are included in your returned scoring materials and on the MDTP web site.
- Also, please feel free to call the Site Director with any questions or to arrange a meeting at your school to help you interpret your results.

Site Director: Mary Sirody, msirody@math.ucla.edu, (310)825-0798
- New User Orientation
- Use of MDTP in PD and Teacher Collaboration
- Analysis of Test Results and Ways to Inform Instruction
- Use of Written Response Materials
- Alignment with the Common Core
Daskala Process Overview

**Purchase of Daskala Access**
- Processed thru mdtp.ucsd.edu
- Prepayment (via PO or check) for use of Daskala is required prior to registration

**Submit Required Class and School Info to MDTP**
- Information required is specified in the Excel MDTP template and includes class rosters, student names, teachers and school info

**Teachers Receive Log-In Information**
- MDTP sends student usernames, passwords, and log-in info (within 5 working days of receipt of completed MDTP template)

**Teacher Administers Tests**
- Student computers need internet connection, Adobe Flash Player v.9.0.028 or higher

**Analysis of Results**
- Results available online to teachers as soon as students submit their completed tests
- Plan and initiate appropriate instruction to address student weaknesses

**Further Information**
- Details, explicit instructions and further info can be found at mdtp.ucsd.edu/daskala.shtml
- Your site director is always happy to assist
About Diagnostic Exams.....

- Encourage students not to guess, so that a correct diagnosis of what they know is achieved
- If leave problem blank, teacher can differentiate between disinformation vs. misinformation
- Times are suggested; allow extra time if needed
- Provide both English and Spanish versions to students who may need to refer to Spanish version
- Not to be used as a final; not an achievement exam; limited to concepts the workgroup felt were necessary for success in the next course
- If used for placement, should be used as one of multiple measures and with appropriate data analyses
Next Instructional Steps
Area/Perimeter Support

- Using whole numbers only, draw every possible rectangle with an area of 24 square units on graph paper. Write $A = 24 \text{ un}^2$ inside each figure. Label the dimensions (length and width) of each rectangle.

- Estimate the areas of Montana and California using the grid below. Which state has the greatest area? Compare the area of Montana to the area of California. Explain how you estimated the area of each state.
2-71. Examine the shape made with algebra tiles at right.

a. Write an expression that represents the perimeter of the shape. Then evaluate your expression for $x = 6$ and $y = 10$ units.  
   \[ 4y + 2x + 2; \ 4(10) + 2(6) + 2 = 54 \text{ units} \]

b. Write an expression that represents the area of the shape. What is the area if $x = 6$ and $y = 10$ units?  
   \[ y^2 + 2x + 1 = (10)^2 + 2(6) + 1 = 113 \text{ square units} \]
Developed in concert with multiple choice items

Designed to encourage students to write out their mathematical reasoning and thus, think more deeply about mathematics

Designed for teachers to learn more about their students’ strengths and weaknesses

Opportunity to address weaknesses in a new context

Provide enrichment

Common Core Standards for Mathematical Practice

- 1 Make sense of problems and persevere in solving them
- 2 Reason abstractly and quantitatively.
- 3 Construct viable arguments and critique the reasoning of others.
- 4 Model with mathematics.
AR Wire

A wire is bent into the shape of a rectangle with a width of 7 and a length of 12.

A. The wire is then bent into a different shaped rectangle which is not a square. Sketch such a rectangle and find values for its length and width. Show how you found these numbers.

B. The wire is then bent into a square. Sketch the square and determine the length of one of its sides. Show how you found this number.

B. The wire is then bent into a circle. Sketch the circle and determine the length of its diameter. Show how you found this number.
Bent Wire Essence Statement

Algebra Readiness: Measurement of Geometric Objects

The task is to find, from a wire shaped into a rectangle, one possible set of dimensions for another rectangle that could be formed from the same wire. Then determine the unique dimensions of a square and the unique dimensions of a circle, both molded from the same wire. All require the solution of sub-problems for which work should be clearly shown. To fully accomplish the task, student work will be evaluated on the presentation of the solution as well as its accuracy.

- To begin the problem, student work will demonstrate an understanding that the perimeter of the given rectangle must be known and is 38.

- To find dimensions of a rectangle that is not a square, student work will demonstrate an understanding that the sum of that rectangle’s length and width must be 19 and that the length and width must be different. The ratio of the width to the length in the sketch should be somewhat close to the ratio of the dimensions stated.

- Student work will include a sketch of a square. To find its dimensions, student work will demonstrate an understanding that all four sides of the square have the same measure, leading to a square with side \( \frac{38}{\pi} \approx 9.5 \).

- Student work will include a sketch of a circle. To find the diameter of the circle, student work will demonstrate an understanding of \( \pi \) as the ratio of a circle’s circumference to its diameter or will use a circumference formula such as \( C = \pi D \) to arrive at the diameter. The exact value of the diameter may be given or approximated by a decimal:

\[
\frac{38}{\pi} \approx 12.0967767 \approx 12.1
\]

POSSIBLE EXTENSIONS FOR CLASS ACTIVITY:

Bend the wire into an equilateral triangle and determine the length of one of its sides. Show how you found this number.

Compute the areas of the shapes.

Next consider bending the wire into a regular hexagon.

Finally, you may want to compare the areas of different figures with the same perimeter; in particular, you might explore the effect on area resulting from increasing the number of sides of regular polygons.
Wire Rubric

For this written response activity, your work should clearly show how you solved each part. Label any figures you draw.

A wire is bent into the shape of a rectangle with a width of 7 and a length of 12.

A. The wire is then bent into a different shaped rectangle which is not a square. Sketch such a rectangle and find values for its length and width. Show how you found these numbers.

B. The wire is then bent into a square. Sketch the square and determine the length of one of its sides. Show how you found this number.

C. The wire is then bent into a circle. Sketch the circle and determine the length of its diameter. Show how you found this number.

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<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sketch three shapes and find the length of the wire OR sketch one shape with correct dimension(s).</td>
</tr>
<tr>
<td>2</td>
<td>Sketch at least two shapes with correct dimensions OR sketch three shapes with one correctly dimensioned.</td>
</tr>
<tr>
<td>3</td>
<td>Sketch all three shapes with two correctly dimensioned and one correctly explained.</td>
</tr>
<tr>
<td>4</td>
<td>Sketch all three shapes correctly dimensioned and explained.</td>
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Note: See General Scoring Rubric for Written Response Items for further guidelines.
Written Response Materials

- Written response items correlated to topic areas on the diagnostic tests from the Pre-Algebra to the Calculus Readiness level

- Each item includes...
  - An Essence Statements
  - A Specific Rubric

- Order a Written Response CD http://mdtp.ucsd.edu
Written Response for Formative Assessment

- Score student work according to the MDTP Specific Rubric
- Opportunity for departmental collaboration
- Provide a clear expectation to students about what is required to receive a higher score.
- Reflect and decide upon next steps in cycle