CGI Math
Teacher Learning Center

Problem-Solving Notebook
Cognitively Guided Instruction K-6

You're spending several days this year learning about children's thinking in your CGI seminar. You're learning about problem types and solution strategies as well as ways to organize your instruction to support students to learn with understanding. Although you're learning a lot this summer, what you'll learn in your own classroom if you regularly pose these problems to your students will far exceed anything you could ever learn in a seminar. We know that you're busy and it's hard to find the time to try new things so we set up this Problem-Solving Notebook to support you to use these problems with your students.

Many teachers find the following useful in helping them pose problems to students. (If you are someone who uses electronic records, feel free to adapt this process so that your problem-solving notebook is a problem-solving folder on your computer!) This document is available for download at https://www.cgimath-tlc.org/materials-from-our-cgi-pd-sessions. (Word format)

1. Obtain a 3-ring binder to help you organize your work this year.

2. Throughout our workshop you will keep track of problems that you plan to pose to your students. You might write your own problems or choose problems that others have written. You can find problems at the end of many chapters in *Extending Children's Mathematics.* You can check out the problems at https://www.cgimath-tlc.org/mentor-teachers or look at the handouts of problems that were on the video if you need additional problems to pose to your students. The more you pose these problems to your students, the easier it will become for you to generate your own problems to meet your students' needs. To start, it's fine for you to select problems that other people have written.

3. Choose template A, B or C for your problem. Or make your own template.

4. Write the problem on the space provided. Make a copy for each student in your class.

5. When possible, have another teacher at your grade level pose the same problem to her or his class that you are posing to yours.

6. Have your students solve the problem. Try this format.

    a. Pose the problem to your students. Read the problem out loud and help the students understand the problem. If you have students who might not understand the problem if they read it themselves, ensure that you provide appropriate support for them to understand the problem. This support could be as straight-forward as reading the problem aloud several times or more complex for students who need additional comprehension support.

b. Try your best not to teach or suggest strategies for solving the problem. Be patient with yourself if you end up inadvertently telling a student how to solve a problem. It's hard to adopt this new role.

c. Observe your students as they solve the problem. Ask questions to help you understand what they're doing. If students struggle to represent their thinking, you could write some notes on their paper. While observing, choose 2 – 4 students to share their strategies with the class. You could choose students who solved the problem in different ways or you could choose students who used similar strategies that embed a concept that you want other students to understand.

d. Have 2-4 students share their solutions with the class. If possible, ask the students who aren't sharing their work to explain portions of the strategy being shared. This practice will help you assess the understanding of additional students and will support students to attend to each other's ideas.

7. Collect the student work, 3-hole punch the work and put it into the notebook. You could have a separate tab for each problem.

8. If you have time, sort your student work into the categories of strategies that you learned about in the workshop. You could choose to record this sort and track students over time. You won't have time to sort your student work every single time you pose a problem.

9. Templates that you could use to plan the sharing of solution strategies are also included. We will discuss this template on days 3 and 4.

10. Make a goal for yourself. Perhaps you'll pose a problem a week or a problem or every two weeks.

11. At first you might pose problems that are similar to the ones you saw during our workshop and aren't necessarily connected to the specific math topic you are currently focused on. With practice, you'll be able to pose problems that are integrated with your math lessons.

12. If you are doing it "right" you'll have struggles and questions along the way. Reach out to the teachers in your CGI/ECM workshop or your instructor for support. If you use Facebook, like the CGI Facebook page (@CGIMath). Post questions there and CGI teachers around the world will chime in with their ideas.

A teacher's best resource is other teachers. Write the name and contact information from at least 2 other teachers who teach the same grade level as you and are attending the workshop below:

Problem to Pose to my Students	**Notes about this Problem** What standard(s) would this problem address? What numbers might work best? Other notes?
Problem Type:	Concepts embedded in this problem:
Problem Type:	Concepts embedded in this problem:
Problem Type:	Concepts embedded in this problem:

Problem to Pose to my Students	**Notes about this Problem** What standard(s) would this problem address? What numbers might work best? Other notes?
Problem Type:	Concepts embedded in this problem:
Problem Type:	Concepts embedded in this problem:
Problem Type:	Concepts embedded in this problem:

Problem to Pose to my Students	**Notes about this Problem** What standard(s) would this problem address? What numbers might work best? Other notes?
Problem Type:	Concepts embedded in this problem:
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Problem Type:	Concepts embedded in this problem:

Problem to Pose to my Students	**Notes about this Problem** What standard(s) would this problem address? What numbers might work best? Other notes?
Problem Type:	Concepts embedded in this problem:
Problem Type:	Concepts embedded in this problem:
Problem Type:	Concepts embedded in this problem:

Name _____

Problem solving notebook – template A

Solve this problem

Show your thinking below

Name _____
problem solving notebook – template B

Read this problem

Choose a pair of numbers from the pairs below to put into this problem that will challenge but not overwhelm you. Put the first number in the first blank and the second number in the second blank.

(_____ _____) (_____ _____) (_____ _____)

Solve the problem. Show your thinking in the space below

Name _____
problem solving notebook – template C

Solve this problem

Show your thinking in the space below.

Solve this problem a different way and show your thinking on the back of this page

Student Work Sort Template (use after students solved the problem)

<table>
<tr><td colspan="2">Problem:</td></tr>
<tr><td>Strategy:

Student who used this strategy:</td><td>Strategy:

Student who used this strategy:</td></tr>
<tr><td>Strategy:

Student who used this strategy:</td><td>Strategy:

Student who used this strategy:</td></tr>
<tr><td>Students whose strategies I don’t understand:</td><td>Students who used incorrect strategies:</td></tr>
</table>

Strategy Share Planning Template 1
Learning Goals:

Problem

Strategies to Share	Plans While Sharing This Strategy

Students with Additional Needs:

Lesson Planning Template 2 (Purposeful Pedagogy Model)

1. Choose a problem to pose to your students.

2. What concepts and relationships might students engage with when solving this problem? (Consider describing these concepts in relationship to one of your math standards)

The following are aspects of the Purposeful Pedagogy and Discourse Instructional Model:

3. **Anticipate** how your students may solve each problem. You could choose to set a learning goal for students who use each type of strategy. The form titled, ***Anticipate Strategies and Set Learning Goals***, may help you organize your thoughts.

4. **Select and Sequence** If the students solve the problem as you anticipated, which strategies would you discuss and in what order would you discuss them?

5. **Discuss/Compare and Contrast** Write one or more questions for each strategy that you that you would ask to the rest of the students to:
   - help them focus on the important concepts and relationships in the strategy
   - help them engage with the learning goal you set for them

   The table titled, ***Planning a Strategy Discussion Session***, may help you organize your thoughts for your responses to #4 and #5.

Anticipate Strategies and Set Learning Goal (use when planning instruction)

Problem:	
Strategy: Learning Goal for students who use this strategy:	Strategy: Learning Goal for students who use this strategy:
Strategy: Learning Goal for students who use this strategy:	Strategy: Learning Goal for students who use this strategy:

Planning a Strategy Discussion Session
Problem:

Strategies my student might use (listed in order that I plan to share them)	**Important Concepts or Relationships Embedded in this strategy**	**When strategy is shared, here are some questions I will ask the other students**