

## PMI Strategies for Reviewing Math Homework

- **Think-Pair-Share**

Ask students to *think* about a particular question or problem. (If they already solved the problem for homework, this is a chance to think back and remember the approach they took. If they got stuck on the problem, it's a chance to remember where they got stuck.) The length of the "think" stage should be fairly short, but the time depends on the question or problem. Next, *pair* up students to talk about and compare their solutions. Then, ask the pairs to *share* their ideas with the whole class. Sometimes it makes sense to have every pair share (and record responses on the board), whereas other times it may be best just to hear from a few pairs and discuss those pairs' responses all together.

- **Jigsaw**

This is an effective way to review a small number of key homework problems, especially challenging problems that not all students completed. (See below for possible ways to choose problems.) Place students in equal-sized groups. Group members will collaborate to become experts on one problem. After discussing the assigned problem, each group member should be prepared to share either (a) a complete solution to the problem or (b) an incomplete solution with questions/list of challenges. Form new groups so that there is an expert on each problem in each of the new groups. (If you started with 5 groups of 4 students, you should now have 4 groups of 5 students.) In the new groups, students will discuss each of the problems and make notes/additions to their homework papers.

- **Expert Teams**

This strategy shares some qualities with the jigsaw method. Small groups of students work together on one of the homework problems. As an "expert team," students collaboratively develop a solution to their assigned problem, based on the work they did for homework (even if their work is incomplete). Team solutions should not represent just one person's approach to the problem; it should be a joint solution that represents multiple views and strategies. You will need to remind students to ask each other questions and provide support in eliciting everyone's ideas about the problem. Teams will record their joint solutions on a poster, white board, or chalkboard. Teams also list the challenges they faced in solving their problem. You may also ask students to include alternate strategies. Once teams' solutions are on display, there are several options such as having a whole-class discussion about the solutions or doing a gallery walk (see below).

- **Gallery Walk with Post-Its**

Small groups will prepare solutions to homework problems – one problem per group. As described above, groups should post solutions that represent collaborative work and multiple strategies, drawing on individual students' homework approaches. In small groups, students will circulate among the posted problem solutions. Groups can compare their strategies to those on display. They can add new ideas or questions to the posted solutions with Post-It notes. They can also make additions to their own homework solutions. Use a timer and have groups spend the same amount of time at each posted solution. Then, provide time for groups to review, discuss, and incorporate the information from the Post-Its that have been added to their posted solutions. It may be helpful to facilitate a whole-class discussion, have students make presentations to the class, or require students to write up a final version of their team solution.

- **Zooming In**

Sometimes there is one homework problem that created a significant challenge for the entire class. This is an opportunity to “zoom in” and develop solutions together. Place students in small groups. Within each small group, you will invite two students to give you their solutions (even if the solutions are incomplete). You will make photocopies of the two solutions, just enough for that group, so that each group member has a copy of the two solutions. (Alternately, students can copy the work themselves by hand.) Then, the group will follow this process:

1. Individually, students will study the two solutions and make observations about the work.
  - a) Record strengths of the work.
  - b) Record misconceptions in the work or places where a student got stuck.
2. Students will share observations with group members.
3. Group members will brainstorm ways to help one another move forward with the problem.

After groups have had time to examine two different solutions and share observations with one another, a whole-class discussion can be very helpful for synthesizing ideas from across the groups and preparing students to make another attempt at solving the problem. For students who have already solved the problem, this is an opportunity to develop and justify an alternate solution.

- **Centers/Stations**

When students solve homework problems at home, they typically do not have access to manipulatives and other concrete materials that are available in the classroom. Set up different areas of the classroom for students to use concrete materials (or technology) to check their homework solutions, find an alternate representation of a homework solution, or extend a homework problem.

- **Choosing Problems for Homework Review**

Have a chart like the one below prepared for students at the beginning of math time or at the beginning of the day. Use this information to choose problems for the homework review.

| HW Problem # | I had no difficulties completing this problem | I was stuck with this problem but figured out what to do with the assistance of other(s) or available resources | I got stuck with this problem but figured out what to do by myself | I got stuck with this problem and my group couldn't figure it out | I had no idea how to start this problem |
|--------------|---|---|--|---|---|
| 1            |   |   |  |   |   |
| 2            |   |   |  |   |   |
| 3            |   |   |  |   |   |
| ...          |   |   |  |   |   |

Here is an alternate chart that can help you to select problems for review:

| Homework Problem Number | Write your name here for 2 problems you most want to talk about in small groups: |
|-------------------------|--|
| 1                       |  |
| 2                       |  |
| 3                       |  |
| ....                    |  |