



PoW Membership: Resources & Strategies for Effective Implementation

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This course is designed for current subscribers of the Problems of the Week who want to make the most of their membership. After completing the six-week course participants will be introduced to all of the resources associated with PoW membership access. You will be able to make an informed decision about how to implement using PoWs with your students, and you'll have an idea of further steps to try when you are ready.

Our problem solving process can be compared to the writing process. We encourage problem solvers to:

- read the problem
- get started
- carry out a strategy
- draft a solution and explanation
- reflect
- get feedback
- revise

The resources that we provide with our problems are designed to help teachers encourage their students to develop the Common Core State Standards' *Mathematical Practices*.

Goals

We hope this course helps you:

- learn more about the resources provided with each of the Math Forum's Problems of the Week (PoWs) and how they can help you enhance student competence and confidence in problem solving and communication.
- develop concepts of mathematical problem solving and communication, both your own and your students'.
- enhance your understanding of the Common Core State Standards' *Mathematical Practices* and the role of PoWs in addressing them.
- learn more about assessing student work and providing effective feedback.
- expand your toolkit of strategies for managing problem solving in your classroom.
- participate in an ongoing community of teachers using PoWs.

Course Requirements

Participants enrolled in this course are expected to have:

- Problem of the Week username/password
- Internet-accessible computer

Introduction:

Participants who successfully complete the course activities will receive a Certificate of Completion from the Drexel University School of Education indicating they have completed 15 hours (1.5 CEUs) of Professional Development. For Pennsylvania residents we are also able to provide Act 48 credit.

Requirements:

Most assignments can be completed anytime during the assigned round.

Contributions to the Discussions should be thoughtful and add something of value to the topic.

Our approach is to

1. value everyone's contributions as we all share our explorations and wonderings.
2. ask and answer questions of ourselves and others.
3. think of how this can transfer to our classrooms.

Schedule

Round 1: Problem Solving

Focus:

- *Problem solving as a vehicle for teaching and learning mathematics.*

Objectives:

- Become oriented to the Bb/Vista environment (only an Internet connection and Web browser are required).
- Introduce yourself and become acquainted with the other course participants.
- Become oriented to the PoW areas of the Math Forum.

Round 2: Communication

Focus:

- *The nature of good communication in problem solving and the teacher's role in facilitating it.*

Objectives:

- Individually solve and submit to a PoW.
- Revise PoW submission.
- Become familiar with the available teacher resources.
- Increase understanding of good communication in problem solving.
- Discuss how to facilitate students' reflection and revision of their work.

Round 3: In Your Classroom: Mathematical Practice #1 (first half)

Focus:

- *Variety of classroom implementations.*
- *Helping students practice making sense of problems.*

Objectives:

- Be aware of the ongoing PoW schedule and available resources.
- Use the "Scenario" feature.
- Present a PoW in classroom. Practice thinking in terms of "I notice..." and "I wonder..." to encourage students to *Make sense of problems*
- Have some students submit their noticing/wondering lists (or simulate this experience) online (minimum of 3 students or groups of students).

Round 4: In Your Classroom: Mathematical Practice #1 (second half)

Focus:

- *Using the Math Forum's PoW office functionality to respond to your students' drafts with just "I notice" and "I wonder" statements.*
- *Exploring ways to make the most of the PoW office functionality to maximize problem solving discussions in the classroom.*
- *Helping students practice perseverance.*

Objectives:

- Become oriented to My PoW Work to view student work
- Have some students use their My PoW Work page.
- Reflect on and discuss how students can be helped to *"make sense of problems and persevere in solving them"* at your grade level.
- Continue to think in terms of "I notice" and "I wonder."
- Share ideas for managing problem solving in the classroom given everyone's time constraints.

Round 5: In Your Classroom: Mathematical Practice #3

Focus:

- *The goal is not to be over and done. The goal is to think, reflect, revise, and master.*

Objectives:

- Discuss how we can help our students start to embrace the practice *"Construct viable arguments and critique the reasoning of others."*
- Try something that someone else described as you introduce the next PoW (FunPoW, PreAlgPoW, AlgPoW, GeoPoW or LibraryPoW) to your students.
- Have students draft their solutions.
- Have some students submit solutions or continue to simulate that experience to become familiar with the functionality options.
- Use the "I notice..." and "I wonder..." method to provide feedback to your students.
- Have students check the links on My PoWs to read, reflect and revise.

Round 6: Making the Most of Your PoW Membership

Focus:

- *Be aware of the resources available to you.*
- *Now that you know more about what is available, what are your questions?*
- *As part of the Math Forum PoW Community, how can you stay connected?*

Objectives:

- Revisit all of the different resources you have the ability to access with your Class Membership.
- Visit and explore the Problems Library.
- Visit and explore Write Math.
- Consider how to use the *"Tips/Ideas from Teachers"* discussion to continue having contact with your new PoW course friends.
- Consider how the Math Forum's blogs and social media can help you stay connected.

Readings

Title: *Common Core State Standards: Mathematics*

Author: Common Core State Standards Initiative

Edition/Year: 2010

Available here: <http://www.corestandards.org/the-standards/mathematics/>

Title: *Problem Solving and Communication Activity Series: Program Description & Introduction*

Author: The Math Forum

Additional information: PDFs of these are linked from the weekly readings assignment pages.

They are also available from Web Links under Course Tools.

Title: *Problem Solving and Communication Activity Series*

Author: The Math Forum

Additional information: These are available from Web Links under Course Tools.

Title: *Enhanced Problem Packet for Teachers*

Author: The Math Forum

Additional information: PDFs of these are linked from the weekly readings assignment pages.

The link to the index page of them is also available from Web Links under Course Tools.

Title: *Problem Solving Articles*

Problem Solving–It Has to Begin with Noticing and Wondering

Writing to Develop Understanding: The Math Forum @ Drexel's PoWs

Developing Algebraic Thinking

Author: The Math Forum

Additional information: PDFs of these are linked from the Math Forum's website. The link to the index page of them is also available from Web Links under Course Tools.

Recommended Resources

Title: *Dr. Math® Gets You Ready for Algebra*

Author: The Math Forum

Publisher: John Wiley & Sons

The book is a series of questions and answers arranged according to a standard math pre-algebra class, and supplemented with Internet references and a glossary.

Available here: <http://mathforum.org/pubs/dr.mathbooks.html>

Title: *Dr. Math® Explains Algebra*

Author: The Math Forum

Publisher: John Wiley & Sons

The book is a series of questions and answers arranged according to a standard Algebra I class, and supplemented with Internet references and a glossary.

Available here: <http://mathforum.org/pubs/dr.mathbooks.html>