Background: The National Research Council brought together a group of mathematicians to discuss issues regarding how children learn mathematics. The group came to consensus on important issues around the teaching and learning of mathematics. Their findings were compiled into a book, *Adding It Up*. The condensed version of this book is *Helping Children Learn Mathematics*. It is from the research developed in this book that the Milwaukee Mathematics Framework was designed.

Goal: To understand how the components of the Mathematics Framework are connected to the teaching and learning of mathematics.

Materials: Copies of the Mathematics Framework, Copies of the first chapter of Helping Children Learn Mathematics pgs. 8 – 18, chart paper and markers for each table group.

Facilitator: Let’s take a deeper look at the Mathematics Framework and really examine what it’s all about. (Place a copy of the framework on the overhead) Ask participants what details make up the framework.

Sample answers might be:
- It’s a circle shape meaning…all areas are connected
- The content topics are in the middle
- Communication is the center of it all

Facilitator: Going around the circle is the mathematical content that children are expected to know, as defined by the state standards (number, geometry, algebra, etc.). On the outside are five components of mathematics teaching and learning that support strong mathematical understanding. (Go over the components.) If we focus too much on one area of one of these components, students’ mathematics will tend to be fragile. It’s important to remember all of these ideas, the content and the components, are connected, with students’ communication being a central idea linking it all together.
**Facilitator:** Now we’re going to take a deeper look into the various components of the framework.

**Activity:**
1. Divide the participants into groups, with each group having no more than 4-5 members. (Ideally, you will want a minimum of 5 groups so that each group has a component to work with. If you have more than 5 groups, you may assign a component to more than one group. Make sure the components are evenly distributed among the groups.)

2. Give each group a piece of chart paper and markers. Assign the group a component. Each group records the assigned component on the chart paper, and brainstorms ideas about what they think the component means when children are demonstrating this thinking in mathematics. Groups jot down a few ideas at the top of the chart paper.

3. Pass out copies of the chapter from *Helping Children Learn Mathematics*. Identify page numbers where they will find information related to their component. Ask groups to read their assigned component and highlight important phrases or key ideas, which help to clarify the meaning of the component. (Encourage quiet reading honoring all of the participants in the room.)

4. Once completed, groups discuss the main idea of the reading and come to a consensus about what the component means. The group recorder writes one or two sentences about the component on the chart paper underneath the brainstormed idea. (Use only the top half of the paper.)

5. Share your new component understanding with the large group, table-by-table or component-by-component.

Make sure the following points about each component are emphasized in the discussion. If participants don’t mention them, you may want to embellish on their comments.

**Understanding:**
- Know more than isolated facts
- Connect mathematical ideas
- Avoid critical errors in problem solving
- Grasp mathematical concepts

**Computing:**
- Fluent with mathematical procedures
- Accurate and efficient with numbers
- Understand number combinations
- Apply strategies efficiently
Applying:
- Use conceptual knowledge to solve problems
- Ability to pose problems
- Construct solution strategies
- Distinguish what is known and unknown

Reasoning:
- Explain solutions
- Justify procedures
- Communicate thinking levels
- Apply knowledge

Engaging:
- Personal commitment with math
- Give reasonable effort
- Make sense of mathematics
- See mathematics as worthwhile

6. If possible, have participants experience a lesson and make connections to their assigned component of the framework.

7. Participants can use the bottom portion of their chart paper to make the connections from the lesson to their component of the framework. Share several table connections to the lesson in large group.