

# Math Circles Implementation Strategy

## Possible Classroom Configurations:

- Groups of 6 students, combine two “flight crews”
- Optional, one computer per group as resource

## Overview:

The goal of this strategy is to involve students in a discussion around the concepts explored in the **Understanding Math™** or **Understanding Numeration™** software. Math Circles work in conjunction with the Flight Plan strategy and are implemented at the end of a mission. Math Circles provide a wonderful opportunity for a summative evaluation while reinforcing and extending student communication skills e.g. oral expression, written expression and active listening. Listed below are the *key components* of a Math Circle:

1. A *summative journal entry* is based on their collection of journal entries from their mission. For example, if the concept covered is Equivalent Fractions the topics explored would be;
  - i) Different graphic representations of equivalent fractions,
  - ii) Comparison of fractions,
  - iii) Equivalent fractions – the pattern, and
  - iv) Application of equivalent fraction concept.
2. Math journal entries based on Navigator’s Report sheet.
3. Assignment sheet (see Appendix)
4. Self Evaluation sheet (see Appendix)

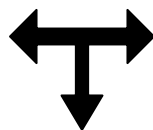
## Procedure:

A Math Circle group is formed with 6 students; ideally two flight crews are combined. The *mission* is clearly understood by each group member (e.g. Equivalent Fractions) and will be the topic of discussion for their Math Circle. In addition to the 6 members of a Math Circle a computer with the Understanding Math Plus™ software installed may be included as a seventh member.

1. One complete mission is the basis for a Math Circle. Each student will have completed a *summative journal entry* for their mission (see Flight Plan description previous page).
2. *Independently*, before beginning their Math Circle, students are asked to prepare questions they may have about ideas or procedures explored during their flights. They place their questions on Post-It notes and bring them to their Math Circle group for discussion.
3. One member of the group is assigned the role of **Word Wizard**. She/he prepares a vocabulary list of new and/or challenging words unique to the mission to share with others in the group on a template supplied by the teacher. The **Word Wizard** shares their vocabulary list with their group members (see Appendix for Word Wizard template).

4. The assigned **Group Leader** comes prepared to run the circle. The Math Circle begins with the **Group Leader** calling their group to order – focus on the *mission*. A Group Leader must ensure that the following conditions are adhered to:
  - i. Everyone must be prepared
  - ii. Group members must be seated facing each other
  - iii. Always make eye contact with the person who is talking
  - iv. Listen actively, listen to understand
  - v. Speak clearly, supporting ideas with evidence
  - vi. Wait for speaker to finish their turn
  - vii. Signal when wanting a turn to speak
  - viii. Build on each other's ideas
  - ix. Stay on topic
  - x. RESPECT each other's ideas
5. Each group member is given time to read their summative journal entry. Others are expected to listen actively and react to their summary *after* their classmate is finished reading.
6. Students need to be given many opportunities to engage with their peers in a positive and supportive manner. In the Appendix a support sheet titled "*The Language of Response*" has been included to help guide students toward developing the requisite skills for respectful group discussions.
7. Each student presents one of their *thick* questions to the circle for discussion. Collectively the Math Circle group helps that student understand the idea and/or procedure that was held in question. A thick question cannot be answered with a simple yes or no. A response to a thick question requires a detailed explanation and it usually begin with words like "how", "what", "why" or "when". For example, "*How can I use Cuisenaire Rods to demonstrate equivalent fractions?*"

Math Circles provide an excellent opportunity for a summative evaluation of individual students!



Combine 2 Flight Crews to create a single Math Circle group of six.

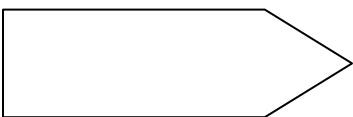
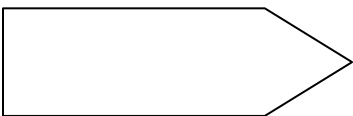
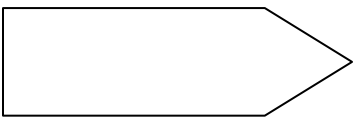
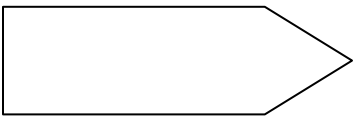
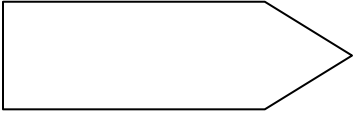




# Math Circle – Word Wizard Report Sheet

Name: \_\_\_\_\_

Topic: \_\_\_\_\_



## The Language of Response

- I agree because . . .
- I disagree because . . .
- I also noticed . . .
- I'd like to add that . . .
- I didn't understand . . .
- Say more about what you mean when you said . . .
- Can you explain that idea further?
- What is your evidence?
- Why do you think that?
- I think what you meant is...
- How do you know that?
- Can you prove that?

