Whole-Class Discussions: Four Corners

MATHEMATICS Grades 10-12

In this strategy, students individually choose a response to a question or prompt and move to an area in the room where they join others who share their ideas and responses. This strategy is flexible and can be used for many topics, questions, and problems in mathematics.

Purpose

- Allow students to make their own response to a question, prompt, or problem; encourage critical thinking.
- Encourage an exchange of student-generated ideas and solutions to problems in small groups.
- Facilitate a class discussion and analysis of student-generated ideas and responses.

Payoff

Students will:

- make up their own minds on the validity of an idea and/or solution to a mathematics problem.
- speak freely in a relaxed environment.

Tips and Resources

- Consider using more than four areas for response.
- Vary the approach by creating a value line. Ask students to rank themselves by lining up in a single line of a continuum; from 'strongly agree' to 'strongly disagree'. This will make student exchanges a necessity so that students can discover exactly where they fit on the line.
- This strategy would work well as a forum in which students could share a product they have created. In this case students would take their work to one of the corners to share, compare, and discuss with other students. This is a very helpful option for students prior to submitting work for teacher assessment.
- Provide a simple protocol for students to discuss the key ideas that prompted them to be in one of the four corners (e.g., What are your responses? How are your responses similar? Explain how your corner responses are different than the other 3 corners?)
- **Opposite Sides** Variation:
  - This is used when there are only two responses. Divide the room in two and ask students to take one side, depending on their decision.
  - If the class is large, use smaller groups to allow all students a chance to speak. Arguments could be written on chart paper. After a specified time, the groups would share their arguments with the whole class.
- See Teacher Resource, *Opposite Sides - Examples*.
- See Teacher Resource, *Four Corners – Examples.*

Further Support

- Keep a diagram of the class and the four corners and use it to record the possible responses for questions, so that students know where to stand in the classroom.
- Post the protocol for sharing ideas at the four corners, so that students generate details that support their choice of one of the four corners.
- The teacher may need to encourage some students to develop a response and make a decision.
- Think about how the four corners also is a concrete graphic representation of students' collective responses to a question.

Whole Class Discussions: Four Corners

MATHEMATICS Grades 10 - 12

What teachers do	What students do
Before • Create a statement or question for students to ponder that has the potential for varying degrees of agreement or preference. • Organize the room into four areas (corners) and label with: strongly agree, agree, disagree, and strongly disagree; four descriptors/categories; four solutions to a homework or class problem. • Give students ample time (2 to 5 minutes) to think about the question, develop a response, and take a stance. Students need to be encouraged to make their own choices. • Questions posed should not require extensive mathematical work.	• Discuss the details of the question posed. • Develop and record an individual response to the question. • Carefully ponder the question, making a personal decision as to the position each will take. • Develop a brief rationale for their choice of one of the four corners.
During • Ask students to move to one of the four corners that best represents their response to a question. • Direct students to get into groups of three (if possible) to discuss the reasons for their choices. In cases where the groups are not large enough, pairs may be formed. In cases where only one student is in a group, the teacher could act as the other member of the pair.	• Move to the corner that best describes their response to a question. • Engage in an exchange of ideas with other members of their group, remaining open and communicative. • Ensure that everyone is heard and that everyone in the group shares equally. • Prepare to speak to the class about the group's discussion, noting common reasons and differing opinions.
After • Call upon various groups to share information gathered in small group discussions with the whole class.	• Highlight their group's main points with the class, pointing out commonalities and discrepancies. • Prompt each member of the group to contribute something to the ideas discussed in the corner group with the class.

Notes

Four Corners - Examples

Example 1:

1 Strongly agree		2 Agree
	Explaining your solution to a problem shows that you understand the mathematics used.	
Disagree 3		Strongly disagree 4

Example 2:

State a relationship that can be modeled in at least three of the different ways listed. Ask students to choose which model they would use and to be prepared to justify why their chosen model is the best choice. Consider directing students to create the model in which case technology or appropriate manipulatives should be placed in corner 4. Other models (e.g., algebraic) may be used instead of those listed below.

1 Pictorial Model		2 Graphical Model
	The sum of the co-interior angles formed by a transversal of parallel lines is 180^{o}.	
Numerical Model 3		Dynamic Model 4

Four Corners - Examples

Example 1:

1 Strongly agree	2 Agree
Clear and precise mathematical communication includes the use of mathematical terms and symbols in an organized manner.	
Disagree 3	Strongly disagree 4

Example 2:

Have the students analyze this set of numbers and decide which concept is represented: simple interest, arithmetic sequence, linear growth, geometric sequence.

1 simple interest A = P × (1 + rt) I = A - P I = P × rt	2 arithmetic sequence $a_n = a_1 + (n - 1)d$
2, 6, 18, 54, 162 … has a <u>constant</u> <u>ratio</u> between its <u>terms</u>. The first term is a_1, the <u>common ratio</u> is r, and the number of terms is n. This is an example of …	
geometric sequence $a_n = a_1 r^{n-1}$ 3	linear growth 4

Four Corners - Examples

Example 1:

1 Strongly agree		2 Agree
	Probability can be expressed as a fraction, decimal, percent, and ratio.	
Disagree 3		Strongly disagree 4

Example 2:

State a relationship that can be modeled in at least three of the different ways listed. Ask students to choose which model they would use and to be prepared to justify why their chosen model is the best choice. Consider directing students to create the model in which case technology or appropriate manipulatives should be placed in corner 4.

1 Pictorial Model		2 Graphical Model
	Is doubling the area of a triangle the same as doubling each side of the triangle?	
Numerical Model 3		Dynamic Model 4