Greater Good in Education
SCIENCE-BASED PRACTICES FOR KINDER, HAPPIER SCHOOLS

GOOD GROUP WORK IN MATH

"Cooperation is the thorough conviction that nobody can get there unless everybody gets there."

–Virginia Burden

OVERVIEW

Before working together, students discuss norms that will help create an environment for productive, positive, and equitable group work in math class.

LEVELS

- PreK/Lower Elementary
- Upper Elementary
- Middle School
- High School
- College

PLANNING FOR IT

WHEN YOU MIGHT USE THIS PRACTICE

- At the beginning of a semester, to set up a productive climate of equitable group work in mathematics class
- To build a growth mindset culture for students around mathematics class
- Prior to beginning group work in math class

TIME REQUIRED

- ≤ 30 minutes

MATERIALS

- Poster paper
- Markers

LEARNING OBJECTIVES

Students will:

- Develop a growth mindset towards mathematics and working with others

- Understand what helps or hinders productive group interactions
- Take the perspective of other students in establishing group norms

ADDITIONAL SUPPORTS

- Making Practices Culturally Responsive
- Adapting Practices for Students with Special Needs
- Making Classrooms and Schools Trauma-Informed and Healing-Centered

SEL COMPETENCIES

- Self-Awareness
- Self-Management
- Social Awareness
- Relationship Skills

HOW TO DO IT

REFLECTION BEFORE THE PRACTICE

- Take a moment to reflect on the behaviors you like and dislike when working in groups. Do you expect your students to feel the same? Why or why not?
- If you have already seen your students work together in groups, reflect on how it has gone. What would you like to build on and/or change in order to create a positive, supportive, and equitable environment?
- What can you do to ensure all students' voices are heard during this activity?

INSTRUCTIONS

Note: Practice 5 of 5 in youcubed Mathematical Mindset practice collection.

TO THE TEACHER

For this activity, be sure to make space for ideas over being pressed for time so that all students' voices are represented.

INTRODUCTION

This activity is valuable to do before students work on math together as it helps create an environment for productive group interactions. Teachers who have tried this activity have been pleased by students' thoughtful responses and found the students' thoughts and words helpful in creating a positive and supportive environment.

LAUNCH (5 MINUTES)

- Let students know that group work will be important in math class because there is so much to learn from each other's thinking and ideas. Reasoning is really important to the discipline of mathematics.

EXPLORE (5 MINUTES)

- Prompt for students to write individually: *Reflect on the things you do NOT like people to say and do when you are working on math in a group.*
    - Students will come up with many important ideas, such as not liking people to give away the answer, or to rush through the work, or to ignore other people's ideas.
- Small group discussion: Groups share their ideas with each other, and agree on the ideas from the group they will share with the class.

DISCUSS (5 MINUTES)

- Collect the ideas from each group and record them in a "What we DON'T like" list on a poster or whiteboard.
    - Have each group contribute one idea, moving around the room until there are no more unique ideas to add.
    - If you hear a comment such as "I don't like waiting for slow people," do not put it on the poster; instead, use it as a chance to discuss the comment. Students are usually very thoughtful and respectful in the ideas they share.

EXPLORE (5 MINUTES)

- Prompt for students to write individually: *Reflect on the things you DO like people to say and do when you are working on math in a group.*
    - Students will come up with many important ideas, such as liking people to check in with each other, to ask how everyone sees it, or to give reasons.
- Small group discussion: Groups share their ideas with each other and agree on the ideas from the group they will share with the class.

DISCUSS (5 MINUTES)

- Collect the ideas from each group and record them in a "What we DO like" list on a poster or whiteboard.
    - Have each group contribute one idea, moving around the room until there are no more unique ideas to add.

CLOSING (5 MINUTES)

- Present the final posters/lists to the class and ask if they agree with these classroom norms or if there is anything else that should be added.
- Let them know that these will be a reference for the class throughout your work together and that they might have more they would like to add in the future.

SOURCE

This is a practice from youcubed, a center at Stanford University led by Professor Jo Boaler. In addition to classroom ideas and videos, youcubed offers a variety of resources for mathematics educators,

including research summaries and professional development.

REFLECTION AFTER THE PRACTICE

- Reflect on the interactions in the group during this exercise. Did any disagreements arise? Did all students seem engaged and have the chance to make their voices heard?
- How can you continue to use the lists throughout the school year? (For instance, you could go back to the “What we DO like” poster as a positive reminder when interactions are less than desirable, or when you perceive that students need support from one another.)

THE RESEARCH BEHIND IT

EVIDENCE THAT IT WORKS

Research has shown that students who learned about growth mindset with regards to mathematics reported more positive beliefs about math, were more engaged in math class, and did better on standardized math achievement tests. Mindset interventions in math benefit all students, but have demonstrated even more power for groups that may be more affected by myths about math learning, including girls, English language learners, and economically disadvantaged students.

In addition, a four-year study of high school students in different types of math classes showed that the students who learned math in mixed-ability classrooms that emphasized cooperative group work, open problem-solving, and the use of multiple strategies–compared to those in traditional math classrooms, which were often ability-grouped and focused on teacher lectures and individual work–demonstrated greater gains in math achievement and greater reductions in achievement gaps, enjoyed math more, and treated each other with more respect, support, and equity.

WHY DOES IT MATTER?

A substantial body of research has indicated that students who have a growth mindset about intelligence–who believe that, with effort, intelligence can be changed over time–are more likely to do well academically.

Importantly, evidence shows that growth mindset can be learned: in a nationally representative study, students who were taught about a growth mindset of intelligence went on to earn better grades (especially if they started out lower-achieving) and select more challenging classes. Grades improved even more in schools with more supportive learning climates, in which peer norms supported the growth mindset message.

Though much of the research on growth mindset has to do with beliefs about intelligence, other research suggests that social and emotional growth mindsets (e.g., believing that personality, emotions, etc., can grow and change) can reduce bias and promote well-being, social competence, and prosocial behavior.

TERMS OF USE

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Please email us at ggsceducation@berkeley.edu with any questions about our programs and resources for educators.

With gratitude,
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