

Using 5U1 to Develop an Equitable Math Learning Community

Equitable teaching and learning of mathematics can only proceed in an environment where students engage deeply with significant mathematical ideas, have opportunities to express their math thinking and listen to the thinking of others, and take responsibility for their learning. Discussions, Math Workshop, and partner work offer critical opportunities to develop and support an equitable math learning community. The information in this document offers guidance about how the first unit of *Investigations* can be used to promote equity in the mathematics classroom and to support the identity and agency of students who have been historically marginalized in mathematics, including Black, Latinx, emergent bilingual, and gender- and neurologically-diverse learners.

How Discussions Can Support Equity Whole-class discussions are an essential feature of the Investigations curriculum, one that provides students the opportunity to articulate their ideas and to consider the ideas of others; to develop mathematical language; and to compare and connect ideas, representations, and solutions. However, “classrooms that are rich in mathematical discourse...are...high-risk for reproducing patterns of racism and marginalization.” (Ball, 2019, slide 11) Therefore, it is important to think about and plan for how to make participation in such discussions equitable; how to establish a “community in which students are prepared to listen actively and contribute ideas.” (See *Implementing Investigations in Grade 5*, p. 30.)

<p>Before School Starts</p>	<p>Consider how discussions will work in your class, in ways that support students’ development of a positive identity and equitable participation of the students in the class. There should be options of different ways to participate, an appreciation for taking risks, and an acceptance and celebration of difference. Use the page about Whole-Class Discussions (p. 30 of <i>Implementing Investigations in Grade 5</i>) to help you consider:</p> <ul style="list-style-type: none"> • how to organize the physical space so students can participate as both a contributor and a listener. • how students will indicate they would like to share a thought, build on an idea, or ask a question of or disagree with a classmate in ways that are respectful of all learners. • how to communicate the power of mistakes as opportunities to learn and the importance of disagreeing respectfully. • how and when to use targeted facilitation moves (such as turn and talk or repeating/rephrasing) to support students’ participation and listening to others. • how you will support students who are reluctant to participate, before and during a discussion. • how you will support students in listening carefully to each other. • how to engage students in working together with you to achieve equitable participation.
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Session 1.2 1 Activity, p. 34 <i>Primes and Squares</i>	Have a conversation about participation in whole class discussions, and your goal of having everyone contribute. Share decisions you have made about how discussions will be structured (how students can sit, show they would like to share a thought, respond to others). Ask students to share ideas about how to make discussions good learning opportunities for everyone.
Session 1.5 3 Activity, p. 57 <i>Solving a Number Puzzle</i>	At the end of the discussion, ask students: <ul style="list-style-type: none"> • What helps you share your ideas? • What helps you listen to others' ideas?
Session 2.1 2 Activity, p. 73 <i>Naming Strategies</i>	At the end of the discussion, explain that you asked these students to share because they used different approaches, and that you want to give everyone in the class an opportunity to explain their work and thinking over time. Consider asking: <ul style="list-style-type: none"> • What was it like for you to share your work today? • How did rehearsing ahead of time help you? <i>(for students who did)</i> Let students know that you will be finding ways to support each of them in sharing their work and ideas with the class.
Session 2.2 1 Activity, p. 76 <i>Using Arrays to Represent Solutions</i>	Explain that towards the end of this discussion, students will have opportunities to turn and talk to a neighbor about an idea or question. Explain how they will partner, and what's expected of them during such a conversation. Afterwards, reflect briefly on how students felt the turn and talk went.
Session 2.6 2 Activity, p. 104 <i>Multiplication Strategies</i>	Now that students have participated in a number of discussions, have a conversation about what helps them participate. Ask questions such as: <ul style="list-style-type: none"> • What helps you listen when a classmate is sharing? • What might help you share your ideas or work? What doesn't help? • How can we as a community support each other during discussions? If you notice that some students are not speaking, find time for an individual conversation with them to better understand how you and others could support them during discussions. Also, consider creating an Exit Card with one or two questions that all students can respond to individually.

Session 3.1 1 Activity 2, p. 119 <i>Solving a Division Problem</i>	<p>As you observe students at work on their division posters, you'll be looking for different strategies to share in the end-of-session discussion. Use this as an opportunity to support students who do not share often in the whole group.</p> <ul style="list-style-type: none"> • Select students whose work was not shared in Session 2.1 • Let each student know why you would like them to share their work and ask them if they would like to “rehearse” with you beforehand. If students are hesitant, you can share their work or do it together.
Session 3.4 1 Activity, p. 138 <i>Numbers Off the Tower</i>	<p>The end-of-session discussion includes opportunities for several students to share their ideas. As you observe this activity, consider asking students who have not yet shared in a discussion, or those who may not be viewed as having status in the math community, to share their solutions.</p>
Session 3.4 2 Activity, p. 141 <i>Division Notation</i>	<p>At the beginning of the discussion, explain that students will have an opportunity to share ideas, listen to the ideas of others, and respond to other people’s ideas. Ask:</p> <ul style="list-style-type: none"> • How can you show that you are listening to other peoples’ ideas? • How can you respond to someone else’s idea? (ask a question, add on, agree, disagree) How can you disagree in a respectful way? • How can you invite people into the conversation? Make room for others to contribute? Are you aware of how often you are speaking?
Session 3.4 2 Activity, p. 141 <i>Division Notation</i>	<p>At the end of the discussion, ask students:</p> <ul style="list-style-type: none"> • What was helpful about looking at other students’ work? about listening to other students’ ideas? • What would help you feel comfortable sharing your work/ideas in a future discussion? • What might make help you share an idea you’re not sure of yet?

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- What chances do students have for productive struggle? Do *all* students have opportunities to persevere?
- Where do students have opportunities to make choices? Is this true for *all* students?
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How Math Workshop Supports Equity Math Workshop is an important structure that provides an opportunity for individuals, pairs, or small groups to work on several activities, usually focused on similar mathematical content, over several sessions. It helps “students develop independence and learn to take responsibility for their own learning as they choose activities, keep track of their work, use and take care of classroom materials, and work with others.” (*Implementing Investigations in Grade 5*, p. 36) Sometimes, some students are not afforded the opportunity to participate in Math Workshop because they are not perceived as ready to make their own choices, to work independently, or to work productively with a partner. An equitable math learning community provides support for all students to engage fully in Math Workshop.

Before School Starts	<p>Decide how Math Workshop will operate as an equitable structure, in ways that encourage perseverance, decision-making, agency, responsibility, and accountability.</p> <ul style="list-style-type: none"> • When and how will students make choices about which activity to work on, with what tools, and for how long? They might also be making choices about where to work and with whom. • How will activities be organized? How will the materials be made available? • How will students know what the activities are, where they can work, with whom, what’s expected and required, etc.? • How will students (and you) keep track of their choices? Of their work? <p>(See pp. 36-39 of <i>Implementing Investigations in Grade 5</i>.)</p>
Session 1.4 2 Activity, p. 52 <i>Introducing Math Workshop</i>	<p>Introduce Math Workshop by communicating the decisions you’ve made about how this structure will work in your classroom. Talk with students about the purpose of and your expectations for Math Workshop. See</p>
Session 1.5 1 Math Workshop, p. 56 <i>Number Puzzles and Order of Operations</i>	<p>Before this second Math Workshop in the unit, take time to reflect together as a class about how Math Workshop went in Session 1.4, including what worked and didn’t. Address any questions about where to get tools, how to move between activities, etc. See p. 52 for ideas.</p>
Session 2.5 2 Math Workshop, p. 97 <i>Multiplication Practice</i>	<p>Now that students have had some experience with Math Workshop, review your expectations. Ask:</p> <ul style="list-style-type: none"> • <i>Are there things about Math Workshop that are challenging for you? Do you have ideas about how we as a class can improve those things?</i> • <i>Sometimes you work in partners. How can you make sure that you are working well together? What is hard about this? What can you do about it?</i>

<p>Session 3.7 1 Math Workshop, p. 157 <i>Practicing Division</i></p>	<p>Gather information about students' experience with Math Workshop and use it to inform a discussion about what could make it work better for everyone. Ask students to respond (in writing, using emojis, via video – to keep students' thoughts, which might include comments about individual children – private) to questions like:</p> <ul style="list-style-type: none"> • What do you like or dislike about MW? Why? • Do you prefer working alone, with a partner, or a small group during Math Workshop? Why? • What is challenging about Math Workshop? <p>You might follow up with individuals, have a conversation with small group, or have a whole-class discussion about what you noticed in their responses.</p>
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How Partner Work Supports Equity A strong collaborative mathematics community gives students the opportunity to work together to solve problems, to learn from each other, to support and encourage others, and to be supported and encouraged by others in their growth as math learners. Throughout *Investigations* students work in partnerships as they engage in activities, play games, and discuss their work and ideas. Understanding what it means to “be a good partner” and how to make space for each person’s ideas, is an important part of an equitable learning community.

Before School Starts	<p>Students work in partnerships as they do activities, play games, and discuss their work and ideas. Think about how to create equitable partnerships that support each student’s identity as a math learner. Consider:</p> <ul style="list-style-type: none"> • how to establish partners. Will you consider students’ math, social, language, and other needs? Will you assign partners randomly? Will students select their own partners? Will the method of choosing partners vary depending on the activity? • how often to change partnerships. Will students work together throughout a unit? for several sessions? for individual activities? • how to engage students in conversations about what it means to be a good partner, how to ask for and give help, and what a balanced partnership looks and sounds like. • whether you will use “Turn & Talk” as a structure during whole class discussions. If so, think about who students will talk to (e.g. a designated math partner, the person sitting to the right or across from them), how partners will take turns sharing their ideas, and how you will signal to bring them back together. • how to talk with students about expectations about listening to and responding to each other’s ideas.
Session 1.2 2 Activity, p. 36 Number Puzzles: 2 Clues	<p>Explain how students will be partnered. Ask students to generate a list of things good partners do when working together (e.g. take turns, share materials, listen to each other’s ideas). Discuss one aspect of partner work together. It is likely that students work in pairs in other subject areas; find opportunities to discuss other aspects throughout the day and over time</p>
Session 1.2 3 Activity, p. 37 More than One Array	<p>Before students talk to a partner about whether all the numbers fit both clues, explain how Turn & Talks will work. Explain how students will know who to talk to, how partners will take turns sharing their ideas, and how you will signal the end of the Turn & Talk and bring them back together.</p>

<p>Session 2.3 1 Activity, p. 82 <i>Multiplying by 10s</i></p>	<p>Reflect on how students worked together to explain to each other how they solved the four problems.</p> <ul style="list-style-type: none"> • How did you and your partner decide who would speak first? • How did you make sure both people had a chance to share their thinking and one person didn't take up all the time? • Did you and your partner have the same or a different idea? If your ideas were different, what did you talk about?
<p>Session 2.3 2 Activity, p. 84 <i>Multiplication Compare</i></p>	<p>In preparation for playing <i>Multiplication Compare</i> together, ask students:</p> <ul style="list-style-type: none"> • How will you make sure that each person gets a chance to explain their ideas about which expression has the greater product? • If your partner is stuck and asks for help, how can you give them a helpful clue without telling them the answer?
<p>Session 2.4 2B Activity, p. 93 <i>Multiplication Compare</i></p>	<p>Ask students about their experiences playing <i>Multiplication Compare</i> with a partner and how well they think worked together.</p> <ul style="list-style-type: none"> • What helped you work cooperatively with your partner? What's an example of how you and your partner worked together cooperatively? • What's an example of how your partner gave you a helpful clue when you were stuck? • What difficulties did you have to work out together?
<p>Session 3.1 1 Activity, p. 119 <i>Solving a Division Problem</i></p>	<p>As students prepare to work with a partner on the task/problem:</p> <ul style="list-style-type: none"> • Remind them about earlier conversations about taking turns talking and listening to each other's ideas. • As students are working, circulate among the pairs to determine which pairs you will ask to share during the discussion. Consider pairs who used different strategies as well as pairs that include students who have not yet shared their work.
<p>Session 3.6 2B Activity, p. 152 Math Workshop: <i>Division Compare</i></p>	<p>As you introduce the new game, <i>Division Compare</i>, gather students' ideas about how they will listen and respond to each other as they are discussing which expression has the larger quotient.</p> <ul style="list-style-type: none"> • How will your partner know you are really listening to them? • What if you disagree with your partner's answer or reasoning? What are some things you could say?

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