

## Using 4U1 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 Support Equity** Whole-class discussions are an essential feature of the *Investigations* curriculum, one that provides students the opportunity to articulate their ideas and consider the ideas of others, develop mathematical language, and 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 4*, p. 30.)

**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 4*, 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.

**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.

<p><b>Before School Starts</b></p>	<p><b>Planning for Whole Class Discussions</b> 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 4</i>) to help you consider:</p> <ul style="list-style-type: none"> <li>• how to organize the physical space so students can participate as both a contributor and a listener.</li> <li>• 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.</li> <li>• how to communicate the power of mistakes as opportunities to learn and the importance of disagreeing respectfully.</li> <li>• how and when to use targeted facilitation moves (such as turn and talk or repeating/rephrasing) to support students’ participation and listening to others.</li> <li>• how you will support students who are reluctant to participate, before and during a discussion.</li> <li>• how you will support students in listening carefully to each other.</li> <li>• how to engage students in working together with you to achieve equitable participation.</li> </ul> <p><b>Planning for Math Workshop</b> 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"> <li>• 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.</li> <li>• How will activities be organized? How will the materials be made available?</li> <li>• How will students know what the activities are, where they can work, with whom, what’s expected and required, etc.?</li> <li>• How will students (and you) keep track of their choices? Of their work?</li> </ul> <p>(See pp. 36-39 of <i>Implementing Investigations in Grade 4</i>.)</p>
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	<p><b>Planning for Partner Work</b> 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"> <li>• 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?</li> <li>• how often to change partnerships. Will students work together throughout a unit? for several sessions? for individual activities?</li> <li>• 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.</li> <li>• whether you will use “Turn &amp; 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.</li> <li>• how to talk with students about expectations about listening to and responding to each other’s ideas.</li> </ul>
<p><b>Session 1.1</b>  <b>1 Discussion, p. 27</b>  <i>How Many in This Array?</i></p>	<p><b>Discussions</b> Before discussing the juice can problem, 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.</p>
<p><b>Session 1.2</b>  <b>2 Activity, p. 37</b>  <i>Making Arrays</i></p>	<p><b>Partner Work</b> 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>
<p><b>Session 1.3</b>  <b>3 Discussion, p. 43</b>  <i>What Do You Notice About Arrays?</i></p>	<p><b>Discussions</b> At the end of the discussion, ask students:</p> <ul style="list-style-type: none"> <li>• What helps you share your ideas?</li> <li>• What helps you listen to others’ ideas?</li> </ul>
<p><b>Session 1.4</b>  <b>3 Math Workshop, p. 50</b></p>	<p><b>Math Workshop</b> 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.</p>

<p><b>Session 1.5</b>  <b>1 Activity, p. 58</b>  <i>Multiplicative and Additive Comparison</i></p>	<p><b>Partner Work</b> As students prepare to work with a partner on the task/problem:</p> <ul style="list-style-type: none"> <li>Remind them about earlier conversations about taking turns talking and listening to each other's ideas.</li> </ul> <p>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>
<p><b>Session 1.6</b>  <b>3 Math Workshop, p. 67</b>  <i>More Multiplicative Comparison Problems</i></p>	<p><b>Discussions</b> The discussion in Session 1.8 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 ideas.</p>
<p><b>Session 1.6</b>  <b>3 Math Workshop, p. 67</b>  <i>Multiples and Factors</i></p>	<p><b>Math Workshop</b> Now that students have had some experience with Math Workshop, take time at the end of Math Workshop to reflect together about how it's gone. Address any questions about where to get tools, how to move between activities, etc.</p> <ul style="list-style-type: none"> <li>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?</li> <li>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?</li> </ul>
<p><b>Session 1.7</b>  <b>2 Activity, p. 72</b>  <i>Introducing Multiple Turn Over</i></p>	<p><b>Partner Work</b> In preparation for playing <i>Multiple Turn Over</i>, ask students:</p> <ul style="list-style-type: none"> <li>How will you and your partner decide who will go first to name a factor?</li> <li>During each round, what should each player be doing?</li> <li>If your partner is stuck and asks for help, how can you give them a helpful clue without telling them the answer?</li> </ul>
<p><b>Session 1.8</b>  <b>1 Discussion, p. 79</b>  <i>Comparison Problems</i></p>	<p><b>Discussions</b> 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:</p> <ul style="list-style-type: none"> <li>What was it like for you to share your work today?</li> <li>How did rehearsing ahead of time help you? (<i>for students who did</i>)</li> </ul> <p>Let students know that you will be finding ways to support each of them in sharing their work and ideas with the class.</p>

<p><b>Session 1.8</b>  <b>2 Math Workshop, p. 81</b>  <i>Multiples and Factors</i></p>	<p><b>Math Workshop</b> 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"> <li>• What do you like or dislike about Math Workshop? Why?</li> <li>• Do you prefer working alone, with a partner, or a small group during Math Workshop? Why?</li> <li>• What is challenging about Math Workshop?</li> </ul> <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>
<p><b>Session 2.1</b>  <b>3 Discussion, p. 94</b>  <i>Identifying All the Factors</i></p>	<p><b>Discussions</b> Now that students have participated in a number of discussions, have a conversation about what helps them participate. Ask questions such as:</p> <ul style="list-style-type: none"> <li>• What helps you listen when a classmate is sharing?</li> <li>• What might help you share your ideas or work? What doesn’t help?</li> <li>• How can we as a community support each other during discussions?</li> </ul> <p>If you notice that some students are not speaking, find time for an individual conversation with them to better understand how you and others can support them during discussions. Also, consider creating an Exit Card with one or two questions that all students can respond to individually.</p>
<p><b>Session 2.2</b>  <b>1 Discussion, p. 102</b>  <i>Strategies for Finding Factors of 200 and 300</i></p>	<p><b>Partner Work</b> Plan to use a “Turn and Talk” right after you ask students to look at the lists of factors of 100, 200, and 300. Explain who they will talk to, how partners will take turns sharing their ideas, and how you will signal the end of the Turn &amp; Talk and bring them back together. Then partners turn and talk about:</p> <ul style="list-style-type: none"> <li>• If you look at all three lists, what do you notice?</li> </ul>
<p><b>Session 2.2</b>  <b>1 Discussion, p. 102</b>  <i>Strategies for Finding Factors of 200 and 300</i></p>	<p><b>Partner Work</b> Reflect on how students worked together to share their ideas in the Turn &amp; Talk.</p> <ul style="list-style-type: none"> <li>• 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?</li> <li>• Did you and your partner have the same or a different idea? If your ideas were different, what did you talk about?</li> </ul>

<p><b>Session 2.3</b>  <b>1 Activity, p. 109</b>  <i>Factors of 16 and 48</i></p>	<p><b>Planning for a Discussion</b> As you observe students at work, you’ll be looking for different student representations 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"> <li>• Select students whose work was not shared in previous sessions.</li> <li>• 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.</li> </ul>
<p><b>Session 2.3</b>  <b>2 Discussion, p. 111</b>  <i>Are the Factors of 16 Also Factors of 48?</i></p>	<p><b>Discussions</b> 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"> <li>• How can you show that you are listening to other peoples’ ideas?</li> <li>• How can you respond to someone else’s idea? (ask a question, add on, agree, disagree) How can you disagree in a respectful way?</li> <li>• How can you invite people into the conversation? Make room for others to contribute? Are you aware of how often you are speaking?</li> </ul>
<p><b>Session 2.3</b>  <b>2 Discussion, p. 111</b>  <i>Are the Factors of 16 Also Factors of 48?</i></p>	<p><b>Discussions</b> At the end of the discussion, ask students:</p> <ul style="list-style-type: none"> <li>• What was helpful about looking at other students’ work? About listening to others’ ideas?</li> <li>• What would help you feel comfortable sharing your work or your ideas in a future discussion?</li> <li>• What might help you share an idea you’re not sure of yet?</li> </ul>

As you leave Unit 1, the work of co-creating an equitable math learning community is not over. The curriculum will continue to suggest opportunities to check in on various aspects of norms in your classroom, and the questions above can be helpful tools for ongoing conversations with your students. You can also use these questions to keep equity at the forefront of your mind, as you reflect on how your class is functioning as an equitable learning community:

- 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?
- Whose voices am I hearing? Whose work is being shared and discussed? Whose ideas are not present in math discussions?
- How are partners working together? Are students aware of/trying to be a good partner?