

Pearson Response to EdReports Evaluation of Investigations 3 Kindergarten-Grade 2

Investigations in Number, Data, and Space® is a K–5 mathematics curriculum designed to engage students in making sense of mathematical ideas. This third edition of the curriculum, *Investigations 3*, is built on the strong foundation of the first two editions and the six major goals that have guided the development of the curriculum. The curriculum is designed to:

- support students to make sense of mathematics and learn that they can be mathematical thinkers;
- focus on computational fluency with whole numbers as a major goal of the elementary grades;
- provide substantive work in important areas of mathematics—rational numbers, geometry, measurement, data, and early algebra—and the connections among them;
- emphasize reasoning about mathematical ideas;
- communicate mathematics content and pedagogy to teachers; and
- engage the range of learners in understanding mathematics.

Our analysis of the EdReports evaluations of *Investigation 3* ©2017 shows the evaluations continue to use a flawed methodology that often produces inaccurate or misleading information about the key features of the instructional materials reviewed. This is particularly evident in the ratings the program received on the Mathematical Practice-Content Connection criteria.

A Curriculum Built Around Math Practices

In *Investigations*, students' development of mathematical concepts is fostered by practices that the Common Core State Standards for Mathematics calls the Standards for Mathematical Practices. "Developing an understanding of what it means to do mathematics is fundamentally about the practices of the discipline. *Investigations in Number, Data, and Space* has always integrated in the learning sequence those core mathematical practices that focus on reasoning, communication, and making sense. This third edition of the curriculum makes more explicit the mathematical practices that have always been embedded in the materials." "Just as students have to learn mathematical content, they also need to learn how to engage in mathematical practices through targeted, intentional planned instruction. It is not sufficient to post a list of practices on the wall or have students check off when they are engaging in a particular practice." (Implementation Guide, p. 44)

This approach has been so powerful that many math educators consider the program a hallmark of effective instruction on these habits of mind. One of its most recognized strengths is the seamless integration of content and the Mathematical Practices.

In *Investigations 3*, several features were added to the program to give greater visibility to the role of the math practices in the curriculum. These include the following:

- **Mathematical Practices in This Unit Essays** In each unit is a Mathematical Practice in this Unit essay that describes two *highlighted practices* and provides examples of how teachers support students to learn about those practices. Each of the eight practices is highlighted twice at each grade. The math practices for the unit are carefully chosen because the mathematical content of the unit, provides important opportunities for students to learn how to engage in that practice. When viewed collectively, across K-5, these 12 essays offer teachers an in-depth view of *each* Math Practice.
- **Math Practice Notes for Highlighted Practices** Throughout the sessions, in each curriculum unit, are sidebar notes that point out opportunities for students to engage in the highlighted mathematical practices and provide tips at point of use for how teachers can attend to these practices.
- **Math Practice Notes for Non-Highlighted Practices:** Additional sidebar notes within the sessions point out opportunities for engaging students in mathematical practices that are not the highlighted practices for the unit.
- **Highlighted Practices in Ongoing Assessment** Part of providing targeted, intentional, planned instruction in the mathematical practices is assessing students' learning. The highlighted practices are integrated into *Ongoing Assessment: Observing Students at Work* for relevant sessions.
- **Assessment checklists for the Highlighted Practices** Assessment Checklists that focus on the highlighted practices are provided in each unit. These offer a way to gauge students' progress in incorporating the highlighted practices into their mathematics work. Like the *Ongoing Assessment* questions, these checklists show the close integration of the math content and math practices

Given the comprehensive coverage to the mathematical practices throughout the program across grades, the TERC authors and the Pearson team were surprised and confused by the ratings of the reviewers on Indicators 2f, 2gi, and 2gii.

The evidence statements for Indicator 2f: *Materials carefully attend to the full meaning of each practice standard*, suggest that either the guidelines do not provide adequate guidance to help reviewers evaluate how well the instructional material under review helps students develop proficiency with these standards or that the reviewers themselves do not have a clear understanding of how students become proficient math thinkers and problems solvers. For example, in the Kindergarten evaluations, reviewers maintain that the instructional materials attend "superficially" to MP5, citing as evidence sessions in which students are using a specific tool (such as a ten frame or a set of geometric solids) rather than being able to *choose* any tool. In several instances, it appears that the reviews did not take into consideration the context in which the "tool" was being used. In one instance, the ten frame is used as a gameboard and thus it would not be appropriate for students to choose a different tool. In another instance, geometric solids are used as an introduction to a 3D Shape Hunt where students look for objects in their environment that match the 3D solids. In both examples information is provided to the teacher, highlighting that these are tools that are new to students but that they will be available throughout the unit/grade. What the reviewers seem to not be taking into consideration is the learning that needs to take place to help students develop proficiency with MP5, *Use appropriate*

tools strategically. Using appropriate tools strategically means that students have a thorough understanding of the different tools available so that they can make informed decisions about which tool is most appropriate for a given situation. Providing them with instruction on and experience with the key properties of different tools is a necessary part of the development process and foundational to the program.

These evidence statements also suggest that the reviewers are evaluating individual, discrete events within the instructional materials rather than seeing these individual events as part of an integrated whole. When designing the curriculum, the TERC authors looked at what opportunities students have to learn about these mathematical practices at each grade level and how these different opportunities within a grade level and across grade levels help students build understanding of and develop an appropriate level of proficiency with the practices.

Across the primary grades, Kindergarten through Grade 2, reviewers consistently rated the instructional materials as partially meeting expectation Criterion 2g, Indicators 2g.i and 2g.ii, both of which address MP3, *Construct viable arguments and critique the reasoning of others*. At each grade level, the respective reviewers note that “much of the student engagement in the class discussion is teacher prompted without giving students the opportunity to create their own authentic inquiry in the thinking of others.” The specific evidence statements reflect a similar lack of understanding of how students learn to construct mathematical arguments and to critique the reasoning of others (MP3). For example, in Kindergarten, in one evidence statement, reviewers insist that the activity in Unit 7, Session 1.1 does not present opportunities for students to explain or justify, or analyze other’s argument. However, in the Math Practice note for this activity, the authors specifically point out how the activity promotes students’ learning around constructing viable arguments:

“Respecting students’ questions and using them as opportunities for the class to think together is an important aspect of classroom culture. Such sharing of questions and ideas lays the groundwork for eventually working together to construct arguments and analyze one another’s reasoning.”

In other words, the authors spent dedicated time thinking about how students develop proficiency with these important thinking habits, and throughout the program created learning events that help students learn not just the targeted mathematical practice of the standard, in this case, constructing mathematical arguments, but more importantly, the essential elements that make up the mathematical practice, such as thinking logically, giving clear definitions, creating sound explanations. Of equal importance for this mathematical practice is a conducive learning environment in which students interact respectfully with one another, allowing for a productive environment in which students are well-supported as they critique the reasoning of their classmates.

Helping students develop proficiency with the mathematical practices requires instruction in all of the component elements that make up these habits of mind. The *Investigations* program has made these practices and their component elements a main learning focus for students and integral to students’ mathematical experience in the program.