



## Early Adolescence MATHEMATICS

### Scoring Guide *for Candidates*

- **Part 1** provides you with the tools to understand and interpret your scores.
- **Part 2** provides the scoring rubrics for your certificate area, guiding you as you develop your portfolio entries and prepare for your assessment center exercises.

*National Board Certification  
Promotes Better Teaching,  
Better Learning, Better Schools*

# Contents

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<b>ABOUT THIS SCORING GUIDE .....</b>	<b>i</b>
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## **PART 1: UNDERSTANDING AND INTERPRETING YOUR SCORES**

<b>HOW THE FIVE CORE PROPOSITIONS AND THE STANDARDS INFORM THE ASSESSMENTS AND THE SCORING PROCESS .....</b>	<b>1-2</b>
What Are the Five Core Propositions? .....	1-2
What Are the Standards? .....	1-3
Who Are the Assessors? .....	1-4
<b>INTERPRETING YOUR SCORES .....</b>	<b>1-6</b>
Accessing Your Score Report .....	1-7
Understanding Your Score Report .....	1-8
Key Aspects of the Scoring Process .....	1-10
Evaluating Your Performance .....	1-10
<b>MOVING FORWARD WITH YOUR SCORES .....</b>	<b>1-17</b>
Identifying Your Strengths and Weaknesses .....	1-17
Next Steps .....	1-17
Retake Considerations .....	1-18
Preparing Your Retake Submissions .....	1-23
Filing an Appeal .....	1-24
<b>APPENDIX: LINKS TO RESOURCES .....</b>	<b>1-26</b>

## **PART 2: UNDERSTANDING AND APPLYING THE SCORING CRITERIA**

<b>SCORING RUBRICS FOR PORTFOLIO ENTRIES .....</b>	<b>2-1</b>
Entry 1: Developing and Assessing Mathematical Thinking and Reasoning .....	2-1
Entry 2: Instructional Analysis: Whole-Class Mathematical Discourse .....	2-6
Entry 3: Instructional Analysis: Small-Group Mathematical Collaborations .....	2-10
Entry 4: Documented Accomplishments: Contributions to Student Learning .....	2-15
<b>SCORING RUBRICS FOR ASSESSMENT CENTER EXERCISES .....</b>	<b>2-19</b>
Exercise 1: Algebra and Functions .....	2-19
Exercise 2: Connections .....	2-21
Exercise 3: Data Analysis .....	2-23
Exercise 4: Geometry .....	2-25
Exercise 5: Number and Operation Sense .....	2-27
Exercise 6: Technology and Manipulatives .....	2-29

## About This Scoring Guide

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The *Scoring Guide for Candidates* is a comprehensive overview of the National Board's scoring process. It is essential reading for anyone pursuing National Board Certification®. Together the two parts of the *Scoring Guide for Candidates* will help you on your path toward becoming a National Board Certified Teacher® (NBCT®).

### Part 1: Understanding and Interpreting Your Scores

**Part 1** guides you through the scoring process, providing you with the tools to understand and interpret your scores. Applicable to all certificate areas, **Part 1** includes crucial information about the role of the National Board Standards, which represent a professional consensus on the critical aspects of practice that distinguish accomplished teachers in the field and function as the foundation of each assessment.

Additionally, you will find information in **Part 1** about NBPTS® assessors—the qualified professionals who assign your scores. You will also find the score ranges, which will allow you to match your score to the appropriate level of performance. **Part 1** also discusses the National Board's retake policies, relevant to you if you do not meet the performance standard on your initial certification attempt. In **Part 1** you will learn how to interpret your individual scores and, if necessary, develop strategies to improve them.

### Part 2: Understanding and Applying the Scoring Criteria

**Part 2** provides the scoring rubrics for each portfolio entry and assessment center exercise in your certificate area, guiding you as you develop your portfolio entries and prepare for your assessment center exercises. The rubrics are presented here in a bulleted format to highlight the vital information contained in each. Reading the scoring rubrics will help you think about ways to strengthen your practice and best demonstrate your teaching expertise. The rubrics are the tool that assessors use to determine the appropriate scores for performance in your field.

The NBPTS Web site provides additional documents to assist you in the process of developing your portfolio entries and evaluating your performance. One such document is the [Evaluation of Evidence Guide](#). Each certificate-specific guide corresponds to an individual portfolio entry for your certificate area, and each includes questions that shape how assessors view the evidence you submit.

Other resources that will help you prepare for your assessment include the following certificate-specific documents, all of which are available online at [www.nbpts.org](http://www.nbpts.org):

- *Assessment at a Glance*
- Standards for Accomplished Teaching
- *Portfolio Instructions*



## Part 1:

# Understanding and Interpreting Your Scores

This resource is available as a PDF file. You may select the link below to view or print **Part 1**.

[Scoring Guide for Candidates, Part 1: Understanding and Interpreting Your Scores](#)



## Part 2:

# Understanding and Applying the Scoring Criteria

**Part 2: Understanding and Applying the Scoring Criteria** presents the scoring rubrics for your certificate area. You should read the rubrics while developing your portfolio entries and preparing for your assessment center exercises. These rubrics, which are derived from the Standards, define the levels of accomplished teaching that you must demonstrate. This reference information will help you understand how the rubrics guide assessors in evaluating your work.

Each rubric begins with an overarching statement that summarizes the quality of performance at each of the rubric levels. For example, the overarching statement for a Level 4 rubric might read: "The Level 4 performance provides *clear, consistent, and convincing* evidence of the teacher's knowledge and practice in his or her field." This precise language is used to distinguish between the four levels of the score scale. The body of the rubric consists of statements organized in a manner that reflects the order of tasks or questions within the entry or exercise. If you are asked to discuss your goals in the first response, for example, then the quality statement about goals will be stated at the beginning of the body of the rubric.

One way to understand the meaning of the entire rubric and how it relates to the quality of a performance is to read across the rubric. You can do this by reading the first sentence for Level 4, the first sentence for Level 3, and so on. This reveals the gradations of quality delineated for each feature of the response. A careful reading of the rubrics is an invaluable step in helping you successfully develop your portfolio entries and prepare for your assessment center exercises.

Your portfolio entries and assessment center exercises are scored holistically. To score holistically, an assessor must look at the entry and exercise for its overall quality and evaluate the work as a whole. The response may have characteristics of adjacent performance levels, but the assessor must assign the score that best describes the work as a whole. When scoring, an assessor reads completely, and views, when applicable, the entire entry and exercise before assigning a score. An assessor should read and review supportively, looking for and rewarding those things done well in the entry or exercise.

For more information about understanding and interpreting your scores, please refer to **Part 1**.

### Contents:

- Scoring Rubrics for Portfolio Entries
- Scoring Rubrics for Assessment Center Exercises

## Scoring Rubrics for Portfolio Entries

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### Entry 1: Developing and Assessing Mathematical Thinking and Reasoning

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**In this entry:** You choose two instructional activities and two student responses to each activity that demonstrate how you are able to design a sequence of learning experiences that builds on and gives you insight into students' conceptual understanding of a substantive idea in mathematics, within the context of instruction that enhances students' abilities to think and reason mathematically. You also submit a Written Commentary that provides a context for your instructional choices and describes, analyzes, and reflects on your teaching.

**THE LEVEL 4** performance provides *clear, consistent, and convincing* evidence that the teacher is able to design a sequence of learning experiences that builds on, and gives insight into, students' conceptual understanding of a substantive idea in mathematics within the context of instruction that enhances students' abilities to think and reason mathematically.

**The Level 4 performance provides *clear, consistent, and convincing* evidence:**

- that the teacher sets high, worthwhile, and appropriate learning goals for students based on detailed knowledge of students' interest, abilities, and needs, and that he or she connects the instructional sequence to these goals.

The Level 4 performance provides evidence that the instructional activities are placed in the larger context of instruction that is designed to enhance student learning in mathematics.

- that the instructional sequence includes activities that are sequenced and organized to develop understanding of a substantive mathematical idea as the sequence unfolds while building on students' interest and prior knowledge. The featured activities clearly and consistently promote mathematical reasoning on the part of students and are effective in eliciting responses that can affect instruction.
- of the teacher's deliberate intent to build students' conceptual understanding through the strength of the connections between each of the featured activities and the substantive mathematical idea as well as the connection between the two featured activities.
- that the teacher is able to integrate assessment into instruction and use strategies to probe and push students' mathematical thinking, particularly by providing feedback that includes targeted questions or instructive comments designed to encourage students to use and develop appropriate mathematical written communication, reasoning, and thinking. The analysis of student responses is detailed, specific, and accurate, showing differentiated insight into individual students' learning over time. The feedback and next steps provided to students are rich, detailed, and instructive, moving students toward greater understanding of the featured mathematical concept.
- of the connections among the concept of study, the instructional activities, the analysis of student responses, and the appropriate feedback and next steps for the students.

- of the teacher's own knowledge of mathematics and mathematics pedagogy, as shown through the selection of the concept, the way it is taught, and the teacher's analysis and response to the student work.
- that the teacher is able to accurately describe his or her own practice, analyze it fully and thoughtfully, and reflect on its implications and significance for future practice.

Overall, the Level 4 performance provides *clear, consistent, and convincing* evidence that the teacher is able to design a sequence of learning experiences that builds on, and gives insight into, students' conceptual understanding of a substantive idea in mathematics within the context of instruction that enhances students' abilities to think and reason mathematically.

**THE LEVEL 3** performance provides *clear* evidence that the teacher is able to design a sequence of learning experiences that builds on, and gives insight into, students' conceptual understanding of a substantive idea in mathematics within the context of instruction that enhances students' abilities to think and reason mathematically.

**The Level 3 performance provides *clear* evidence:**

- that the teacher sets appropriate learning goals for students based on knowledge of students' interest, abilities, and needs, and that he or she connects the instructional sequence to these goals, though goals may not be as challenging as in a Level 4 performance.
- that the instructional activities are placed in the larger context of instruction that is designed to enhance student learning in mathematics.
- that the instructional sequence includes activities that are sequenced and organized to develop understanding of a substantive mathematical idea as the sequence unfolds while building on students' interest and prior knowledge, though the sequencing of the activities may not be as adept, or the instruction may not be as focused, as in a Level 4 performance. The featured activities promote mathematical reasoning on the part of students and are effective for eliciting responses that can affect instruction.
- of the teacher's intent to build students' conceptual understanding through the strength of the connections among each of the featured activities and the substantive mathematical idea, as well as the connection between the two featured activities, though the connections may not be as strong as in a Level 4 performance.
- that the teacher is able to integrate assessment into instruction and use strategies to probe and push students' mathematical thinking, particularly by providing feedback that includes targeted questions or instructive comments designed to encourage students to use and develop appropriate mathematical written communication, reasoning, and thinking. The analysis of student responses is accurate, showing insight into individual students' learning over time. The analysis may not be as detailed, specific, and insightful as in a Level 4 performance, and the differentiation between students may not be as great. The feedback and next steps provided to students are instructive, though they may not be as rich and detailed as in a Level 4 performance.
- of the teacher's own knowledge of mathematics and mathematics pedagogy, as shown through the selection of the concept, the way it is taught, and the teacher's analysis and response to the student work.
- that the teacher is able to accurately describe and analyze his or her own practice and reflect on its implications and significance for future practice. However, the reflection may not be as detailed or insightful as in a Level 4 performance. The Level 3 performance may show imbalance or unevenness in the different sources of evidence or in different parts of the analysis.

One part of the performance may be more indicative of accomplished practice than another, but overall, there is *clear* evidence that the teacher is able to design a sequence of learning experiences that builds on, and gives insight into, students' conceptual understanding of a substantive idea in mathematics within the context of instruction that enhances students' abilities to think and reason mathematically.

**THE LEVEL 2** performance provides *limited* evidence that the teacher is able to design a sequence of learning experiences that builds on, and gives insight into, students' conceptual understanding of a substantive idea in mathematics within the context of instruction that enhances students' abilities to think and reason mathematically.

**The Level 2 performance provides *limited* evidence:**

- that the teacher sets appropriate learning goals for students and connects the instructional sequence to these goals. The goals for student learning may be vaguely articulated, of limited significance, or only loosely related to the instruction or student needs.
- that the instructional sequence includes activities that develop students' understanding of a substantive mathematical idea, but thought given to the sequencing of activities may not be evident. The connections to students' prior knowledge may not be clear, and/or the connection to the mathematical concept may not be strong. Though generally addressing the featured mathematical concept, the learning activities may not clearly promote mathematical reasoning on the part of students and may be more procedural or computational, rather than conceptual, in their focus. The activities may be only somewhat effective in eliciting significant information about student understanding.
- that the teacher furthers students' mathematical understanding through his or her analysis and assessment of students' responses to the instructional activity/prompt. The teacher shows limited knowledge of students and limited insight into their learning. Though generally accurate, the analysis of student responses is limited in its scope and specificity and may not address conceptual elements of the work that merit attention. The feedback and next steps provided to students may be general, nonspecific, or incomplete.
- of the teacher's own knowledge of mathematics and mathematics pedagogy.
- that the teacher is able to describe and analyze his or her practice, but the reflection may be vague, general, or focused solely on the procedural aspects of teaching.

The Level 2 performance may be characterized by evidence that hints at accomplished practice, but is too fragmented or uneven to support a classification as a Level 3 performance. Overall, there is *limited* evidence that the teacher is able to design a sequence of learning experiences that builds on, and gives insight into, students' conceptual understanding of a substantive idea in mathematics within the context of instruction that enhances students' abilities to think and reason mathematically.

**THE LEVEL 1** performance provides *little or no* evidence that the teacher is able to design a sequence of learning experiences that builds on, and gives insight into, students' conceptual understanding of a substantive idea in mathematics within the context of instruction that enhances students' abilities to think and reason mathematically.

**The Level 1 performance provides *little or no* evidence:**

- that the teacher sets appropriate learning goals for students and/or connects the instructional sequence to these goals. The goals for student learning may not be goals at all, but rather activities. When stated, the goals are vague, trivial, inappropriate, or not connected to the instruction or student needs.
- that the instructional sequence includes activities that develop students' understanding of a substantive mathematical idea. The sequencing of activities may be illogical or extremely disjointed, and the activities may not address the selected concept.
- of connections to students' prior knowledge. The learning activities do not promote mathematical reasoning on the part of students and may be entirely procedural or computational, rather than conceptual, in their focus. The activities may not be useful for gaining significant insight into student understanding. The learning experiences may consist entirely of closed-ended, trivial activities.
- that the teacher furthers students' mathematical understanding through his or her analysis and assessment of students' responses to the instructional activity/prompt. The teacher shows little or no knowledge of students and little or no insight into their learning. The analysis of student responses may consist solely of what students got right and/or wrong or may focus on criteria outside the stated learning goals. The analysis may fail to recognize students' progress and instead focus on students' mistakes, or it may be so superficial that it misses important elements of the work that merit attention. The feedback and next steps provided to students may be absent or inappropriate.
- of the teacher's own knowledge of mathematics and mathematics pedagogy; serious misconceptions about mathematics may be evident.
- that the teacher is able to reflect on his or her practice. The reflection may be missing or disconnected from the instructional evidence.

Overall, there is *little or no* evidence that the teacher is able to design a sequence of learning experiences that builds on, and gives insight into, students' conceptual understanding of a substantive idea in mathematics within the context of instruction that enhances students' abilities to think and reason mathematically.

## Entry 2: Instructional Analysis: Whole-Class Mathematical Discourse

**In this entry:** You provide a 15-minute video recording of a lesson that demonstrates how you use a classroom discussion and targeted questioning to develop student understanding about an important mathematical idea. You provide evidence of your ability to engage students in mathematical discourse as the whole class investigates, explores, or discovers important mathematical concepts, procedures, or reasoning processes within a stimulating and inclusive environment that promotes student development of mathematical power. You provide a Written Commentary analyzing the video recording and instructional materials.

**THE LEVEL 4** performance provides *clear, consistent, and convincing* evidence that the teacher is able to engage a class of students in mathematical discourse about an important topic in mathematics and enhance students' mathematical understanding and their ability to think and reason mathematically.

**The Level 4 performance provides *clear, consistent, and convincing* evidence:**

- that the teacher sets high, worthwhile, and appropriate goals for student learning based on detailed knowledge of students' needs, interests, and abilities, and connects instruction to those goals.
- that the featured lesson is placed in a larger context of instruction designed to enhance student learning in mathematics and develop students' mathematical power, based on the teacher's own deep knowledge of mathematics and pedagogy.
- that the teacher is able to establish an equitable, accessible, fair, and productive learning environment in which students are fully engaged in learning, as shown through both verbal and nonverbal signs of interest and involvement. Mathematical discourse is facilitated by the teacher's use of carefully crafted questions and prompts that elicit mathematical thinking and reasoning from students, ongoing informal assessment of student learning, and adjustments to instruction as warranted by that assessment. Discourse on the video recording is characterized by active, dynamic verbal exchange, with students' questions, conjectures, and interactions (teacher-student and student-student) demonstrating mathematical reasoning and communication.
- that feedback to students is frequent and supportive and that it enhances student learning.
- that the teacher is able to accurately describe and analyze student interactions and thinking, demonstrating deep knowledge of students as individual learners and insight into student learning.
- that the teacher is able to describe his or her practice accurately, analyze it fully and thoughtfully, and reflect on its implications and significance for future teaching.

Overall, there is *clear, consistent, and convincing* evidence that the teacher is able to engage students in mathematical discourse about an important topic in mathematics and enhance students' mathematical understanding and their ability to think and reason mathematically.

**THE LEVEL 3** performance provides *clear* evidence that the teacher is able to engage a class of students in mathematical discourse about an important topic in mathematics and enhance students' mathematical understanding and their ability to think and reason mathematically.

**The Level 3 performance provides *clear* evidence:**

- that the teacher sets appropriate goals for student learning based on knowledge of students' needs, interests, and abilities, and connects instruction to those goals, though the goals may not be as challenging as in a Level 4 performance.
- that the featured lesson is placed in a larger context of instruction designed to enhance student learning in mathematics and develop students' mathematical power, based on the teacher's own knowledge of mathematics and pedagogy.
- that the teacher is able to establish an equitable, accessible, fair, and productive learning environment in which students are engaged in learning, as shown through both verbal and nonverbal signs of interest and involvement. However, the level of engagement may not be as high as in a Level 4 performance. Mathematical discourse is facilitated by the teacher's use of questions and prompts that elicit mathematical thinking and reasoning from students, though the questioning may not be as skillful as in a Level 4 performance.

There is evidence of ongoing informal assessment of student learning and adjustments to instruction as warranted by that assessment, though evidence of adjustments to practice may not be as strong as in a Level 4 performance. Discourse on the video recording is characterized by verbal exchange, with students' questions, conjectures, and interactions (teacher-student and student-student) demonstrating mathematical reasoning and communication, though the exchanges may not be as dynamic as in a Level 4 performance.

- that feedback to students enhances student learning, though feedback may be less frequent than in a Level 4 performance.
- that the teacher is able to accurately describe and analyze student interactions and thinking, demonstrating knowledge of students as individual learners. However, the analysis may not be as detailed or insightful as in a Level 4 performance.
- that the teacher is able to accurately describe and analyze his or her own practice and reflect on its implications and significance for future practice. However, the reflection may not be as detailed or insightful as in a Level 4 performance. The Level 3 performance may show imbalance or unevenness in the different sources of evidence or in different parts of the analysis.

One part of the performance may be more indicative of accomplished practice than another, but overall, there is *clear* evidence that the teacher is able to engage students in mathematical discourse about an important topic in mathematics and enhance students' mathematical understanding and their ability to think and reason mathematically.

**THE LEVEL 2** performance provides *limited* evidence that the teacher is able to engage a class of students in mathematical discourse about an important topic in mathematics and enhance students' mathematical understanding and their ability to think and reason mathematically.

**The Level 2 performance provides *limited* evidence:**

- that the teacher sets appropriate goals for student learning and connects instruction to those goals. The goals for student learning may be vaguely articulated, of limited significance, or only loosely related to the instruction or student needs.
- that the featured lesson is placed in a larger context of instruction designed to enhance student learning in mathematics. Though the instructional sequence does generally address the selected mathematical topic, the sequence may be vaguely articulated. Evidence of the teacher's knowledge of mathematics and pedagogy may be limited.
- that the teacher is able to establish an equitable, accessible, fair, and productive learning environment. Students' engagement in the discussion may be limited. Though generally on-topic, the discourse on the video recording may not demonstrate strong mathematical communication by students or the teacher. Discourse may be dominated by teacher-student interactions, with limited evidence of student-student exchange. The teacher's use of questions and prompts may not support mathematical thinking and reasoning from students, but instead be more formulaic, computational, or procedural. Evidence of informal assessment of student learning during the lesson is limited.
- that the teacher provides feedback to students, but the feedback may be infrequent, general, or incomplete.
- that the teacher is able to describe and analyze student interactions and thinking. Though generally accurate, the analysis of student interactions is limited in its scope and specificity and may not address conceptual aspects of the discussion that merit attention.
- that the teacher is able to reflect on his or her practice, but the reflection may be vague or general, focus solely on procedural aspects of teaching, or show limited understanding of implications for future teaching.

The Level 2 performance may be characterized by evidence that hints at accomplished practice, but is too fragmented or uneven to support a classification as a Level 3 performance. Overall, there is *limited* evidence that the teacher is able to engage students in mathematical discourse about an important topic in mathematics and enhance students' mathematical understanding and their ability to think and reason mathematically.

**THE LEVEL 1** performance provides *little or no* evidence that the teacher is able to engage a class of students in mathematical discourse about an important topic in mathematics and enhance students' mathematical understanding and their ability to think and reason mathematically.

**The Level 1 performance provides *little or no* evidence:**

- that the teacher sets appropriate goals for student learning and/or connects instruction to those goals. The goals for student learning may not be goals at all, but rather activities. When stated, the goals are vague, trivial, inappropriate, or not connected to the instruction or student needs.
- that the featured lesson is placed in a larger context of instruction designed to enhance student learning in mathematics or develop students' mathematical power. The instructional sequence may not directly address the selected mathematical topic.
- of the teacher's knowledge of mathematics and pedagogy; there may be evidence of serious misconceptions about mathematics on the part of the teacher.
- that the teacher is able to establish an equitable, accessible, fair, and productive learning environment. Students show little or no engagement in the discussion. The discourse on the video recording may show little or no mathematical focus or very weak mathematical communication by students and the teacher. Discourse may be entirely dominated by the teacher, whether questioning or lecturing, to the degree that it is not a discussion at all. The teacher's use of questions and prompts does not support mathematical thinking and reasoning from students and is instead entirely closed-ended, focused on getting trivial right answers.
- of informal assessment of student learning during the lesson, as obvious student misconceptions go unaddressed in the lesson and in the commentary.
- that the teacher provides supportive feedback to students; if feedback is provided, it may be negative or incorrect.
- that the teacher is able to accurately describe and analyze student interactions and thinking. The analysis may fail to recognize student understanding and instead focus on students' mistakes, or it may be superficial.
- of the teacher's ability to engage in reflective thinking about students or his or her instruction. The reflection may be missing or unconnected from the instructional evidence.

Overall, there is *little or no* evidence that the teacher is able to engage students in mathematical discourse about an important topic in mathematics and enhance students' mathematical understanding and their ability to think and reason mathematically.

## Entry 3: Instructional Analysis: Small-Group Mathematical Collaborations

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**In this entry:** You provide a 15-minute video recording of a lesson that demonstrates how you interact with students working in small groups in order to promote mathematical discourse and to develop student understanding about an important mathematical idea. You are required to show how you use manipulative materials or appropriate technology to provide access to or deepen mathematical understanding. You also show how you model questioning strategies and mathematical thinking and reasoning processes to promote interactions between you and the students, as well as among the students in small groups. You provide a Written Commentary analyzing the video recording and instructional materials.

**THE LEVEL 4** performance provides *clear, consistent, and convincing* evidence that the teacher is able to engage students in small-group collaborative learning about mathematics and enhance students' mathematical understanding and their abilities to reason mathematically through the use of manipulative materials or technology.

**The Level 4 performance provides *clear, consistent, and convincing* evidence:**

- that the teacher sets worthwhile and appropriate learning goals for student learning and that he or she connects instruction to those goals.
- that the teacher places the lesson in the larger context of instruction designed to enhance student learning in mathematics and that the teacher bases the lesson on his or her own knowledge of mathematics, mathematics teaching, and the students.
- that the teacher engages students in collaborative learning as they work with each other about a mathematical topic in small groups within the classroom.
- from the video recording that students are involved in discourse about mathematics.
- of the teacher's facilitation of group work so that students are at least partly responsible for their own learning and that of their peers.
- that the teacher informally assesses student understanding during instruction and uses a variety of strategies to probe and push students' thinking, particularly by asking targeted questions designed to encourage students to use and develop appropriate mathematical discourse.
- that the teacher provides all students with opportunities to experience challenging mathematics.
- that the teacher tailors students' instruction, where appropriate, to take into account students' different experiences, circumstances, language proficiencies, and needs.
- that the teacher is able to effectively use appropriate manipulative materials and/or technologies to enhance student learning in light of the learning goals and of mathematical thinking and reasoning and that he or she has a strong rationale for using such instructional resources.
- that the teacher is able to accurately describe, analyze, and evaluate students' work, showing knowledge of students and insight into learning.

- that the teacher is able to accurately describe her or his practice, analyze it fully and thoughtfully, and reflect on its implications and significance, recognizing highs and lows, if any, of the lesson and that he or she is also able to articulate, where appropriate, well thought-out ideas for improvement or change in practice based on the analysis.

Overall, there is *clear, consistent, and convincing* evidence that the teacher is able to use small-group collaborative learning about mathematics and enhance students' mathematical understanding and their abilities to reason mathematically through the use of manipulative materials or technology.

**THE LEVEL 3** performance provides *clear* evidence that the teacher is able to engage students in small-group collaborative learning about mathematics, enhance students' mathematical understanding, and enhance their abilities to reason mathematically through the use of manipulative materials or technology.

**The Level 3 performance provides *clear* evidence:**

- that the teacher sets worthwhile and appropriate learning goals for student learning and that he or she connects instruction to those goals.
- that the teacher places the lesson in the larger context of instruction designed to enhance student learning in mathematics and that the teacher bases the lesson on the teacher's own knowledge of mathematics, mathematics teaching, and students. However, the instruction may not be as adeptly designed, or as focused, as in a Level 4 performance.
- that the teacher engages students in collaborative learning as they work with each other about a mathematical topic in small groups within the classroom.
- from the video recording that students are involved in discourse about mathematics.
- of the teacher's facilitation of group work so that students are at least partly responsible for their own learning and that of their peers.
- that the teacher informally assesses student understanding during instruction and uses a variety of strategies to probe and push students' thinking, particularly by asking targeted questions designed to encourage students to use and develop appropriate mathematical discourse.
- that the teacher provides all students with opportunities to experience challenging mathematics.
- that the teacher tailors students' instruction, where appropriate, to take into account students' different experiences, circumstances, language proficiencies, and needs.
- that the teacher is able to use appropriate manipulative materials and/or technologies to enhance student learning in light of the learning goals and of mathematical thinking and reasoning and that he or she has an appropriate rationale for using such instructional resources.
- that the teacher is able to accurately describe, analyze, and evaluate students' work, showing knowledge of students and insight into learning.
- that the teacher is able to accurately describe her or his practice, analyze it fully and thoughtfully, and reflect on its implications and significance, recognizing highs and lows, if any, of the lesson and that she or he is also able to articulate, where appropriate, well-thought-out ideas for improvement or change in practice based on the analysis. However, the reflection may not be as detailed or insightful as in a Level 4 performance. A Level 3 performance may show imbalance in the different sources of evidence or in different parts of the analysis.

One part of the performance may be more indicative of accomplished practice than another, but viewed as a whole, there is *clear* evidence that the teacher is able to use small-group collaborative learning about mathematics and enhance students' mathematical understanding and their abilities to reason mathematically through the use of manipulative materials or technology.

**THE LEVEL 2** performance provides *limited* evidence that the teacher is able to engage students in small-group collaborative learning about mathematics, enhance students' mathematical understanding, and enhance their abilities to reason mathematically through the use of manipulative materials or technology.

**The Level 2 performance provides *limited* evidence:**

- that the teacher sets appropriate learning goals for student learning and that he or she connects instruction to those goals. The goals for student learning may be vague, of limited significance, or only loosely related to instruction.
- that the teacher places the lesson in the larger context of instruction designed to enhance student learning in mathematics. The instruction may provide only limited evidence of the teacher's own knowledge of mathematics, mathematics teaching, and students.
- from the video recording that students are involved in discourse about mathematics. Evidence of collaboration among students, or that students are at least partly responsible for their own learning and that of their peers, is limited.
- that the teacher informally assesses student understanding during instruction and of the teacher's use of a variety of strategies to probe and push students' thinking. Though focused generally on mathematics, discourse in the small groups may be characterized chiefly by right-answer questions, recall of information, a lack of focus, or limited interaction between and among students.
- that the teacher provides all students with opportunities to experience challenging mathematics.
- of the teacher's knowledge of students and insight into learning, with little differentiation among learners.
- that the teacher is able to use manipulative materials and/or technologies to further learning goals and mathematical thinking and reasoning. The manipulative materials and/or technology used may be loosely connected to instruction.
- that the teacher is able to accurately describe, analyze, and evaluate students' work and shows limited knowledge of students and/or insight into learning. There is limited evidence
- that the teacher is able to describe her or his practice, analyze it fully, and reflect on its implications. The reflection may be global or sketchy and may show limited understanding of implications for future teaching.

A Level 2 performance may be characterized by evidence that hints at accomplished practice, but overall, there is *limited* evidence that the teacher is able to use small-group collaborative learning about mathematics and/or enhance students' mathematical understanding and their abilities to reason mathematically through the use of manipulative materials or technology.

**THE LEVEL 1** performance provides *little or no* evidence that the teacher is able to engage students in small-group collaborative learning about mathematics, enhance students' mathematical understanding, and enhance their abilities to reason mathematically through the use of manipulative materials or technology.

**The Level 1 performance provides *little or no* evidence:**

- that the teacher sets appropriate learning goals for student learning and/or connects instruction to those goals. The goals for student learning may not be goals at all, but rather activities. When stated, goals are vague, trivial, inappropriate, or not connected to instruction.
- that the teacher places the lesson in the larger context of instruction designed to enhance student learning in mathematics. The performance may not address mathematics at all, or mathematical topics may be covered in an extremely superficial and/or disjointed manner.
- of the teacher's own knowledge of mathematics, mathematics teaching, and students. There may be evidence of serious misconceptions about mathematics on the teacher's part.
- from the video recording that students are involved in discourse about mathematics.
- of collaboration among students or that students are at least partly responsible for their own learning and that of their peers.
- that the teacher informally assesses student understanding during instruction, and there is little or no evidence of the teacher's using a variety of strategies to probe and push students' thinking. The activities featured on the video recording may not be small-group activities at all, or they may not address mathematics.
- that the teacher provides all students with opportunities to experience challenging mathematics.
- of the teacher's knowledge of students and insight into learning, with little or no differentiation among learners. The interactions may reveal inappropriate, negative responses to students. Or the questioning techniques employed by the teacher may be entirely close-ended and/or focused on a superficial aspect of the topic under study.
- that the teacher is able to use manipulative materials and/or technologies to further learning goals and/or mathematical thinking and reasoning. The manipulative materials and/or technology used may be disconnected from instruction.
- that the teacher is able to accurately describe, analyze, and evaluate students' work, and it shows little or no knowledge of students and/or insight into learning. There is little or no evidence
- that the teacher is able to describe her or his practice, analyze it fully, and reflect on its implications. The reflection may be missing or not connected from the instructional evidence and may show little or no understanding of implications for future teaching.

Overall, there is *little or no* evidence that the teacher is able to use small-group collaborative learning about mathematics and/or enhance students' mathematical understanding and their abilities to reason mathematically through the use of manipulative materials or technology.

## Entry 4 : Documented Accomplishments: Contributions to Student Learning

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**In this entry:** You illustrate your partnerships with students' families and community, and your development as a learner and collaborator with other professionals by submitting descriptions and documentation of your activities and targeted questions or instructive comments designed to encourage students to use and develop appropriate mathematical written communication, reasoning, and thinking; and fully and thoughtfully analyze the practice you have described, reflect on its implications and significance by recognizing the highs and lows, if any, of the instructional sequence, and articulate, where appropriate, well thought-out ideas for improvement or change in practice based on the analysis.

**THE LEVEL 4** performance provides *clear, consistent, and convincing* evidence of the teacher's ability to impact student learning through work with colleagues, professionals, families, and the community, and as a learner.

**The Level 4 performance provides *clear, consistent, and convincing* evidence:**

- that the teacher treats parents and other interested adults as valued partners in the child's education, and uses thoughtfully chosen, appropriate strategies for reaching out to the families of his or her students. The selected strategies may or may not be original to the teacher, but they are implemented with skill and enthusiasm and are effective in engaging parents and other interested adults in communication that is highly interactive, fostering extensive two-way dialogue focused primarily on substantive teaching and learning issues and individual student progress.
- that the teacher facilitates ongoing, mutually beneficial communications between students and the wider community in a way that enhances teaching and learning.
- that the teacher has strengthened his or her own teaching practice through conscious and deliberate professional development to strengthen knowledge, skills, and abilities in areas that are relevant to his or her teaching and learning context for the purpose of impacting student learning.
- that the teacher has worked collaboratively with colleagues to improve teaching and learning, either within the school or in the wider professional community. In addition, there is clear, consistent, and convincing evidence that the teacher has shared his or her expertise in a leadership role with other educators through facilitating the professional development of other teachers, improving instructional practices, or advocating for positive change in educational policy.
- that the teacher's work outside the classroom has been driven by a conscious and deliberate focus on improving teaching and learning, as opposed to merely fulfilling job requirements. The descriptions and documentation provide a rich, detailed, coherent view of a teacher who has made an impact on student learning through work with other colleagues, professionals, families, and the community, and as a learner.
- that the teacher accurately analyzes and thoughtfully reflects on the significance of all accomplishments taken together, and can appropriately plan for future opportunities to impact student learning.

Overall, there is *clear, consistent, and convincing* evidence of the teacher's ability to impact student learning through work with colleagues, professionals, families, and the community, and as a learner.

**THE LEVEL 3** performance provides clear evidence of the teacher's ability to impact student learning through work with colleagues, professionals, families, and the community, and as a learner.

**The Level 3 performance provides *clear* evidence:**

- that the teacher treats parents and other interested adults as valued partners in the child's education, and uses appropriate strategies for reaching out to the families of his or her students. The selected strategies may or may not be original to the teacher, but they are effective in engaging parents and other interested adults in communication that is interactive, fostering two-way dialogue focused primarily on substantive teaching and learning issues and individual student progress.
- that the teacher facilitates ongoing, mutually beneficial communications between students and the wider community in a way that enhances teaching and learning, although the communications may not be as effective as those in a Level 4 performance.
- that the teacher has strengthened his or her own teaching practice through conscious and deliberate professional development to strengthen knowledge, skills, and abilities in areas that are relevant to his or her teaching and learning context.
- that the teacher has worked with colleagues as a partner or collaborator to improve teaching and learning, either within the school or in a larger professional context, such as within a professional organization.
- that the teacher has shared his or her expertise in a leadership role with other educators through facilitating the professional development of other teachers, improving instructional practices, or advocating for positive changes in educational policy.
- that the teacher's work outside the classroom has been driven by a conscious focus on improving teaching and learning, as opposed to merely fulfilling job requirements. The descriptions and evidence provide a coherent view of a teacher who has made an impact on student learning through work with other colleagues, professionals, families, and the community, and as a learner.
- that the teacher accurately analyzes and thoughtfully reflects on the significance of all accomplishments taken together, and can appropriately plan for future opportunities to impact student learning.

Overall, there is *clear* evidence of the teacher's ability to impact student learning through work with colleagues, professionals, families, and the community, and as a learner.

**THE LEVEL 2** performance provides *limited* evidence of the teacher's ability to impact student learning through work with colleagues, professionals, families, and the community, and as a learner.

**The Level 2 performance provides *limited* evidence:**

- that the teacher treats parents and other interested adults as valued partners in the child's education, and uses appropriate strategies for reaching out to the families of his or her students. The rationale for the selected strategies may be a bit vague and/or there may be limited evidence that the strategies are effective in engaging parents and other interested adults. There may be evidence that though the strategies work with many families, some families are not being fully engaged.
- that the communications with families are focused on substantive teaching and learning issues. Instead, many of the communications may be dominated by procedural issues, behavior, or disciplinary matters, or the communications may not show much differentiation between individual students, with the same communication going to all families.
- that the communications with families are interactive. There may be frequent communications home but these may rely primarily on one-way media, such as notes home or newsletters. The evidence may suggest that parents are well informed about what is going on in the classroom, but there is limited evidence of two-way dialogue with families.
- regarding meaningful communications between the students and the wider community for the purpose of enhancing teaching and learning.
- that the teacher has strengthened his or her own teaching practice through professional development; even if the teacher has engaged in extensive professional development activities, it may be unclear how these activities relate to the knowledge, skills, and abilities that are relevant to his or her teaching and learning context.
- that the teacher has shared what he or she has learned with colleagues by working with them in a role as a partner, collaborator, or leader.

The evidence in a Level 2 performance may indicate that the teacher is an accomplished practitioner within his or her own classroom, but that he or she has not shared his or her expertise with others in a significant way through professional development of other teachers, improving instructional practices, or advocating for positive change in educational policy.

The evidence may suggest that the preponderance of the teacher's activities outside of the classroom has been to fulfill job requirements, as opposed to being a conscious and deliberate effort to impact student learning and improve teaching and learning.

- that the teacher analyzes and reflects on the significance of all accomplishments taken together, and can appropriately plan for future opportunities to impact student learning.

The Level 2 performance may be characterized by evidence that occasionally hints at accomplished practice, but overall, there is *limited* evidence of the teacher's ability to impact student learning through work with colleagues, professionals, families, and the community, and as a learner.

**THE LEVEL 1** performance provides *little or no* evidence of the teacher's ability to impact student learning through work with colleagues, professionals, families, and the community, and as a learner.

**The Level 1 performance provides *little or no* evidence:**

- that the teacher treats parents and other interested adults as partners in the child's education, and uses appropriate strategies for reaching out to the families of his or her students. The rationale for the selected strategies may be very vague, unclear, or absent.
- that the strategies are effective in engaging parents and other interested adults. There may be evidence that some families are overlooked or ignored.
- that the communications with families are focused on substantive teaching and learning issues. Instead, the communications are taken up almost exclusively by procedural issues, behavior, or disciplinary matters.
- that the communications with families are interactive. Communications with families are entirely one-way and/or infrequent. Parents may not be kept informed about what is going on in the classroom. If evidence regarding outreach to the wider community is present, the connections may promote trivial interactions with little impact on student learning.

The Level 1 performance may contain negative or disparaging comments about parents, community, or professionals with little or no evidence of the teacher's efforts to improve the situation.

- that the teacher has strengthened his or her own teaching practice through professional development. If professional development activities are cited, they may be very sketchy or weak or of little or no relevance to the teacher's context.
- that the teacher has worked with colleagues as a partner, collaborator, or leader. If school projects are cited, there may be little or no evidence of their impact on teaching and learning, or the teacher's role in the project may be very unclear or very passive.

There may be evidence that the teacher is an accomplished practitioner within his or her own classroom, but there is little or no evidence that he or she has shared his or her expertise with others.

The evidence may suggest that the teacher's work outside of the classroom has been carried out solely to fulfill job requirements, as opposed to being a conscious and deliberate effort to improve teaching and learning.

- that the teacher analyzes and reflects on the significance of all accomplishments taken together, and can appropriately plan for future opportunities to impact student learning.

Overall, there is *little or no* evidence of the teacher's ability to impact student learning through work with colleagues, professionals, families, and the community, and as a learner.

## Scoring Rubrics for Assessment Center Exercises

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### Exercise 1: Algebra and Functions

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**In this exercise:** You demonstrate knowledge by using the language of algebra to model problem situations; using algebraic techniques and procedures; and identifying and explaining the links between basic patterns and concepts related to functions.

**THE LEVEL 4** response provides *clear, consistent, and convincing* evidence of the ability to model problem situations, employ algebraic techniques and procedures, and explain a functional relationship depicted in a given situation.

**Characteristics:**

- complete and accurate graphical representation of a given set of data
- accurate identification of an algebraic function and complete and accurate algebraic equation that fits the given data
- accurate and fully supported solutions to algebraic equations
- complete and accurate modeling of a given situation, and appropriate identification of its functional relationship

**THE LEVEL 3** response provides *clear* evidence of the ability to model problem situations, employ algebraic techniques and procedures, and explain a functional relationship depicted in a given situation.

**Characteristics:**

- accurate graphical representation of a given set of data
- accurate identification of an algebraic function and complete and accurate algebraic equation that fits the given data
- accurate solutions to algebraic equations, though lacking full support
- a representative sketch and logical explanation of the functional relationship in a given situation

**THE LEVEL 2** response provides *limited* evidence of the ability to model problem situations, employ algebraic techniques and procedures, and explain a functional relationship depicted in a given situation.

**Characteristics:**

- incomplete and/or inaccurate graphical representation of a given set of data
- inaccurate identification of an algebraic function and an incomplete algebraic equation that does not fit the given data
- somewhat inaccurate and unsupported solutions to algebraic equations
- an incomplete sketch and/or incomplete explanation of the functional relationship in a given situation

**THE LEVEL 1** response provides *little or no* evidence of the ability to model problem situations, employ algebraic techniques and procedures, and explain a functional relationship depicted in a given situation.

**Characteristics:**

- incomplete and inaccurate graphical representation and an algebraic function
- inaccurate or missing identification of an algebraic function and an incomplete algebraic equation that does not fit the given data, or the equation is missing
- inaccurate or missing solutions to algebraic equations
- an incomplete or missing sketch and incomplete or missing explanation of the functional relationship in a given situation

## Exercise 2: Connections

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**In this exercise:** You demonstrate knowledge of intradisciplinary and interdisciplinary connections to describe the relationship between related concepts within mathematics and to describe the application of a given mathematical concept to a topic from another curricular discipline.

**THE LEVEL 4** response provides *clear, consistent, and convincing* evidence of the ability to describe the relationship between two concepts within mathematics and to describe the application of a given mathematical concept to a topic from another curricular discipline.

**Characteristics:**

- an accurate description and thorough explanation of the relationship between two mathematical concepts
- a thorough description of the application of a given mathematical concept to a given topic from another discipline

**THE LEVEL 3** response provides *clear* evidence of the ability to describe the relationship between two concepts within mathematics and to describe the application of a given mathematical concept to a topic from another curricular discipline.

**Characteristics:**

- an adequate description and explanation of the relationship between two mathematical concepts
- an adequate description of the application of a given mathematical concept to a given topic from another discipline

**THE LEVEL 2** response provides *limited* evidence of the ability to describe the relationship between two concepts within mathematics and to describe the application of a given mathematical concept to a topic from another curricular discipline.

**Characteristics:**

- incomplete description and explanation of the relationship between two mathematical concepts
- incomplete description of the application of a given mathematical concept to a given topic from another discipline

**THE LEVEL 1** response provides *little or no* evidence of the ability to describe the relationship between two concepts within mathematics and to describe the application of a given mathematical concept to a topic from another curricular discipline.

**Characteristics:**

- an incomplete, significantly flawed, or missing description and explanation of the relationship between two mathematical concepts
- an incomplete, significantly flawed, or missing description of the application of a given mathematical concept to a given topic from another discipline

## Exercise 3: Data Analysis

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**In this exercise:** You demonstrate knowledge of data analysis by creating appropriate graphical representations of given data, and analyzing and interpreting given data.

**THE LEVEL 4** response provides *clear, consistent, and convincing* evidence of the ability to provide various graphical representations and interpretations of a given set of data.

**Characteristics:**

- complete and accurate graphical representation of a given set of data
- meaningful interpretation of the data as seen through the graphical representation
- appropriate and accurate alternate graphical representation of the data
- meaningful, accurate, and fully distinct interpretation of the data as seen through its alternate graphical representation

**THE LEVEL 3** response provides *clear* evidence of the ability to provide various graphical representations and interpretations of a given set of data.

**Characteristics:**

- mostly accurate graphical representation of a given set of data
- meaningful interpretation of the data as seen through the graphical representation
- mostly accurate and appropriate alternate graphical representation of the data
- meaningful and distinct interpretation of the data as seen through its alternate graphical representation

**THE LEVEL 2** response provides *limited* evidence of the ability to provide various graphical representations and interpretations of a given set of data.

**Characteristics:**

- somewhat inaccurate graphical representation of a given set of data
- somewhat irrelevant interpretation of the data as seen through the graphical representation
- some inappropriate or inaccurate alternate graphical representation of the data
- some inaccuracies or irrelevancies or nondistinct interpretation of the data as seen through its alternate graphical representation

**THE LEVEL 1** response provides *little or no* evidence of the ability to provide various graphical representations and interpretations of a given set of data.

**Characteristics:**

- inaccurate graphical representation of a given set of data
- irrelevant interpretation of the data as seen through the graphical representation
- inappropriate or inaccurate alternate graphical representation of the data
- inaccurate or irrelevant or nondistinct interpretation of the data as seen through its alternate graphical representation

## Exercise 4: Geometry

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**In this exercise:** You demonstrate knowledge of geometry by performing the transformations of dilation, reflection, rotation, and translation on a two-dimensional figure, and analyzing the overall effects on a three-dimensional figure caused by a change in one of the figure's dimensions.

**THE LEVEL 4** response provides *clear, consistent, and convincing* evidence of the ability to perform the transformations of dilation, reflection, rotation, and translation on a two-dimensional object, and analyze the overall effects on a three-dimensional object caused by a change in one of the object's dimension(s).

**Characteristics:**

- accurate transformations of dilation, reflection, rotation, and translation on a two-dimensional object
- a thorough and accurate analysis of the effects on a three-dimensional object by a change in one of its dimension(s)

**THE LEVEL 3** response provides *clear* evidence of the ability to perform the transformations of dilation, reflection, rotation, and translation on a two-dimensional object, and analyze the overall effects on a three-dimensional object caused by a change in one of the object's dimension(s).

**Characteristics:**

- mostly accurate transformations of dilation, reflection, rotation, and translation on a two-dimensional object
- an accurate analysis of the effects on a three-dimensional object by a change in one of its dimension(s), though there may be a minor calculation flaw

**THE LEVEL 2** response provides *limited* evidence of the ability to perform the transformations of dilation, reflection, rotation, and translation on a two-dimensional object, and analyze the overall effects on a three-dimensional object caused by a change in one of the object's dimension(s).

**Characteristics:**

- somewhat inaccurate transformations of dilation, reflection, rotation, and translation on a two-dimensional object
- a somewhat incomplete or inaccurate analysis of the effects on a three-dimensional object by a change in one of its dimension(s)

**THE LEVEL 1** response provides *little or no* evidence of the ability to perform the transformations of dilation, reflection, rotation, and translation on a two-dimensional object, and analyze the overall effects on a three-dimensional object caused by a change in one of the object's dimension(s).

**Characteristics:**

- largely inaccurate, or missing, transformations of dilation, reflection, rotation, and translation on a two-dimensional object
- a significantly flawed, or missing, analysis of the effects on a three-dimensional object by a change in one of its dimension(s)

## Exercise 5: Number and Operation Sense

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**In this exercise:** You demonstrate knowledge of different sets of numbers within the real number system, the ability to evaluate numerical expressions, and the ability to use proportionality to model a variety of situations.

**THE LEVEL 4** response provides *clear, consistent, and convincing* evidence of the ability to create numerical expressions from a given set of numbers, and to use proportions to determine ratios and percents.

### Characteristics:

- an accurate numerical expression resulting in a rational number greater than the largest value in the set
- an accurate numerical expression resulting in an irrational number
- appropriate and accurate use of the concept of proportionality with respect to both ratio and percent

**THE LEVEL 3** response provides *clear* evidence of the ability to create numerical expressions from a given set of numbers, and to use proportions to determine ratios and percents.

### Characteristics:

- an accurate numerical expression resulting in a rational number, though a set member or an operation may be repeated, or the wrong set of numbers may be used
- an accurate numerical expression resulting in an irrational number, though a set member or an operation may be repeated or the wrong set of numbers may be used
- appropriate and largely accurate use of the concept of proportionality with respect to both ratio and percent

**THE LEVEL 2** response provides *limited* evidence of the ability to create numerical expressions from a given set of numbers, and to use proportions to determine ratios and percents.

**Characteristics:**

- a somewhat inaccurate numerical expression resulting in a rational number
- a somewhat inaccurate numerical expression resulting in an irrational number
- somewhat inappropriate and inaccurate use of the concept of proportionality with respect to both ratio and percent

**THE LEVEL 1** response provides *little or no* evidence of the ability to create numerical expressions from a given set of numbers, and to use proportions to determine ratios and percents.

**Characteristics:**

- an inaccurate numerical expression resulting in a rational number
- a numerical expression that does not result in an irrational number
- significantly inappropriate and inaccurate use of the concept of proportionality with respect to both ratio and percent

## Exercise 6: Technology and Manipulatives

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**In this exercise:** You demonstrate knowledge of the appropriate use of manipulative materials to support instructional goals, and the appropriate use of technology to support instructional goals.

**THE LEVEL 4** response provides *clear, consistent, and convincing* evidence of the ability to identify, describe, and justify the use of manipulative and technological instructional resources to support student learning of given concepts.

**Characteristics:**

- appropriate selection and detailed explanation of a manipulative instructional resource to support student learning
- appropriate selection and detailed explanation of a technological instructional resource to support student learning

**THE LEVEL 3** response provides *clear* evidence of the ability to identify, describe, and justify the use of manipulative and technological instructional resources to support student learning of given concepts.

**Characteristics:**

- appropriate selection and logical explanation of a manipulative instructional resource to support student learning, though lacking the detail of a Level 4 response
- appropriate selection and logical explanation of a technological instructional resource to support student learning, though lacking the detail of a Level 4 response

**THE LEVEL 2** response provides *limited* evidence of the ability to identify, describe, and justify the use of manipulative and technological instructional resources to support student learning of given concepts.

**Characteristics:**

- somewhat appropriate selection and/or weak explanation of a manipulative instructional resource to support student learning
- somewhat appropriate selection and/or weak explanation of a technological instructional resource to support student learning

**THE LEVEL 1** response provides *little or no* evidence of the ability to identify, describe, and justify the use of manipulative and technological instructional resources to support student learning of given concepts.

**Characteristics:**

- both the selection and explanation of a manipulative instructional resource to support student learning are inappropriate or missing
- both the selection and explanation of a technological instructional resource to support student learning are inappropriate or missing

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