Northwest Evaluation Association

Partnering to help all kids learn®

Primary Grades Instructional Data®

PRIMARY GRADES INSTRUCTIONAL DATA GUIDE

for the Web-based MAP® system

NWEA Philosophy 2
- Scalar-Based Measurement 2
- Cognitive Demand 3
- RIT Difficulty Values 4
  - Reading Level Difficulty 4
  - Text Difficulty 4
  - Other Difficulty Factors 5
  - Presentation 5

PGID Overview 6
- Purpose and Uses 7

Understanding the PGID 8

MAP for Primary Grades Combined Tests 9
- Reading Goal Structure 10
- Mathematics Goal Structure 11

Measures of Academic Progress, MAP, and DesCartes: A Continuum of Learning are registered trademarks of NWEA in the United States or other countries. The names of other companies and their products mentioned in this documentation are the trademarks of their respective owners.

© 2010-2012 Northwest Evaluation Association, 121 NW Everett St, Portland, OR 97209

Telephone: 503-624-1951 • FAX: 503-639-7873

NWEA Philosophy

Guided by our mission—Partnering to help all kids learn™—NWEA is keenly aware of the student achievement differences within a district, a school, and even within a classroom. Students learn and grow when they are presented with information that is appropriately challenging, engaging, but not overwhelming.

Historically, school districts have used a student's age (grade level) as the primary criterion for selecting instructional materials and lessons. This traditional approach provides targeted instruction for only those students performing close to the average. NWEA believes that all students' current achievement levels should be the dominant consideration when grouping students, selecting materials, and providing instruction. Primary Grades Instructional Data (PGID) provides instructors with a tool to translate a wide range of student scores into instructional objectives that allow them to focus on individual student learning needs.

Scalar-Based Measurement

NWEA assessments use a measurement scale proven to be exceptionally stable and valid over time. The scale is based on a modern test theory that aligns student achievement levels and test question difficulties on the same scale. The scale is divided into equal parts (an equal interval scale), like centimeters on a ruler. NWEA calls these parts RITs, which is short for Rasch unIT (named for Danish mathematician Georg Rasch, the test theory's developer). Each subject area has its own unique RIT scale. NWEA uses the RIT scales to measure a student's academic growth over time.

The difficulty of test questions and the achievement level of students are both placed on the RIT scales. A higher score represents a student's ability to perform more complex skills and understand more difficult concepts. RIT scores generally range from 100 to 300, depending on the subject.

Three different dimensions contribute to the overall difficulty of each test question:

- Cognitive demand of the task(s)
- Reading and text level difficulty
- Presentation

Each of these is described in detail on the following pages.

 © 2010-2012 NWEA

Cognitive Demand

NWEA assesses the cognitive rigor of the learning or skills being measured. The table below demonstrates examples of different cognitive process dimensions in mathematics and reading.

Table 1: Cognitive Process Dimensions

COGNITIVE PROCESS DIMENSION	READING: WORD STUDY AND WRITING	MATHEMATICS: ODD NUMBERS
Remember	Which letter is missing in this part of the alphabet? a b c ? e	Which number is an odd number? 4, 7, 8, 10
Understand	Which word rhymes with cat?	Classify the number 47 as an odd or even number.
Apply	(Heard—audio only): Use the letters below to spell the word "stack" correctly. (On screen): a s m r c k t e i	Which strategy could be used to determine if 39 is an even or odd number?
Analyze	Which word is divided into three syllables?	Which conjecture explains the addition of two odd numbers?
Evaluate	Which sentence is edited correctly?	Pat said: ▪ Even numbers must have the numbers 0, 2, 4, 6, or 8 in them. ▪ All other numbers were odd numbers. ▪ The following numbers are even numbers: 26, 84, 601, and the following numbers are odd numbers: 597, 351, 71. Which statement explains the error Pat made?
Create	Use the words to write a sentence about the picture.	John has memorized that numbers ending in 0, 2, 4, 6, and 8 are called even numbers and numbers ending in 1, 3, 5, 7, and 9 are called odd numbers. Maria has learned that numbers that can be evenly divided by 2 are called even numbers and numbers that cannot be evenly divided by 2 are called odd numbers. Which strategy is another way to tell the difference between even and odd numbers? (Strategies listed should not have been previously taught to the students.)

For definitions of the cognitive verbs and terms used in the Primary Grades Instructional Data (PGID) statements, see PGID *Cognitive Verbs Terms and Definitions* and PGID *Vocabulary Terms and Definitions*.

 © 2010-2012 NWEA

RIT Difficulty Values

RIT difficulty values help differentiate between two (or more) test questions that assess the same skill. Establishing a RIT difficulty value typically incorporates some or all of the following criteria:

- Reading level difficulty
- Text difficulty
- Other factors
  - Vocabulary
  - Sentence structure
  - Sentence length
- Presentation

The sections that follow use examples to further explain these difficulty factors.

Reading Level Difficulty

Both of the following example questions assess the same skill. However, the RIT difficulty value of each question is different, based on the differences in the reading level in each passage:

- **What is the main idea of this sentence?**

  Maria waters the flowers in her garden every day.
- **What is the main idea of this paragraph?**

  Cats make good pets. They are clean animals, very cute, and smart. Some cats can open doors by themselves. They are very curious and like to know what's going on in every room of the house. Once they know what's happening, they can do what they are most famous for: nap! Cats nap almost all day long.

The second question has higher RIT difficulty value. Identifying a sentence's main idea generally has a lower RIT difficulty value than identifying a paragraph's main idea.

Text Difficulty

In mathematics, the text difficulty also affects the RIT difficulty value. The following two test questions assess the same skill but have different RIT difficulty values:

- **John had 4 pencils. He got 2 more pencils. John wants to know how many pencils he has now. Which symbol shows what John should do?**

  (answer options: -, +, =, x, ÷)
- **Rolito spent the following amounts on school supplies: $6, $3, $8. How would he determine the total amount he spent?**

  (answer options: add, subtract, multiply, divide, add and divide)

The second question has a higher RIT difficulty value, partly because the answer options are textual. The first question uses symbols for answer options.

 © 2010-2012 NWEA

Other Difficulty Factors

Passages that vary in vocabulary, sentence structure complexity, and sentence length, also affect the RIT difficulty value. The following are listed from lowest to highest RIT difficulty values:

- Putting on a play is a lot of work. Someone makes up a story. People dress up in costumes. Other people get the stage ready. Everybody is important. Sometimes it's hard to tell what is real and what is make-believe!
- Theater is an art that involves the skills of many different kinds of artists and craftspeople, from actors, writers, carpenters, electricians, painters, and more. Putting on a play requires careful planning, organizing, and a good dose of luck. Theater people are a notoriously superstitious lot! In fact, it is bad luck to say the word "Macbeth" in a theater. Instead, it is often referred to as "the Scottish play."
- The techne of theater is composed of a synthesis of various arts, skills, crafts, and intelligences. There is no dominant aspect—the actors, director, playwright, carpenters, stage dressers, painters, and others are all integral to the success of a performance. And they are all united in theater's colorful history of scandal, drama and, concomitantly, superstition. They "out-sailor" sailors when it comes to belief in omens and curses. In fact, the name of one of the great plays in the English language is verboten in theaters. The curse of Macbeth is handily sidestepped by calling it "the Scottish play."

Presentation

MAP for Primary Grades (MPG) tests currently use four presentation styles:

- Multiple choice
- Hot spots
- Click and pop
- Sticky click

The test warm-up provides students with instruction and practice for the different styles. ***It is important that students are familiar with these question styles before they begin the test***.

MAP for Primary Grades assessments include audio instruction unless the assessment includes reading comprehension or decoding. In assessments where reading achievement is not the focus of the measure, audio minimizes students' reading achievement levels as a factor influencing students' scores. This is particularly helpful in addressing higher conceptual content that could be impacted by a student's reading level.

Some test questions appear as a question mark ("?") instead of text to eliminate distractions that text can cause for non-readers. The question is automatically read to the student, and the student may have the question repeated as many times as is necessary.

Many test questions model the use of manipulatives. Students move pictures of objects when counting, using one-to-one correspondence. Students move pictures of objects to show an understanding of readiness for multiplication and division concepts. When Computation questions require the student to place the actual numbers in the answer key instead of choosing one of five options (multiple choice), guessing-related errors decrease; in turn, the accuracy of scores increases. In reading, students are asked to move letters to spell words, create sentences to describe an illustration, and sort and classify letters or sounds.

 © 2010-2012 NWEA

PGID Overview

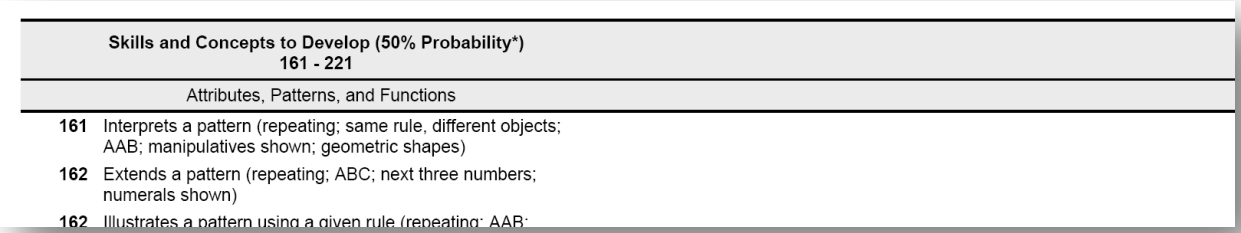
PGID statements describe the content and cognitive complexity of the MAP for Primary Grades Survey with Goals test questions.

Instructors can customize the PGID statement format according to instructional needs. Within the two subject areas, instructors can select either a 3-column or 1-column format. Instructors can further set parameters by limiting to one goal area and selecting a RIT range. At the mid-point RIT in each column of the 3-column format, the probability that a student will correctly answer test questions measuring those concepts and skills varies, depending on whether the instructor chooses the 10-point or 5-point RIT band:

Table 2: RIT Band Ranges

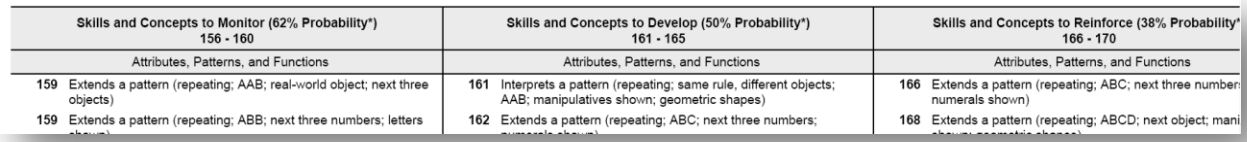
RIT BAND	LOWER RIT RANGE	MID RIT RANGE	UPPER RIT RANGE
5 pt RIT band	62% probability	50% probability	38% probability
10 pt RIT band	73% probability	50% probability	27% probability

1-column PGID Report:



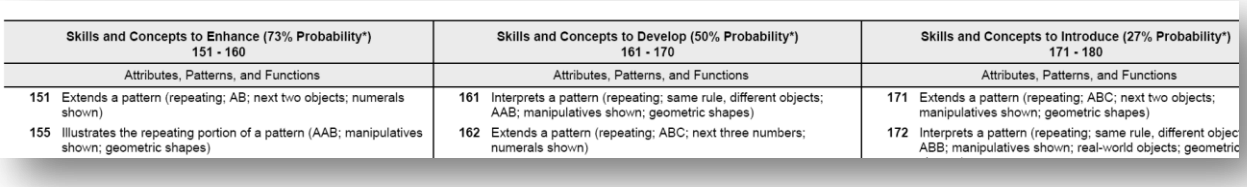
Skills and Concepts to Develop (50% Probability*) 161 - 221	
Attributes, Patterns, and Functions	
161	Interprets a pattern (repeating; same rule, different objects; AAB; manipulatives shown; geometric shapes)
162	Extends a pattern (repeating; ABC; next three numbers; numerals shown)
162	Illustrates a pattern using a given rule (repeating; AAB;

3-column, 5 pt RIT Band PGID Report:



Skills and Concepts to Monitor (62% Probability*) 156 - 160		Skills and Concepts to Develop (50% Probability*) 161 - 165		Skills and Concepts to Reinforce (38% Probability* 166 - 170	
Attributes, Patterns, and Functions		Attributes, Patterns, and Functions		Attributes, Patterns, and Functions	
159	Extends a pattern (repeating; AAB; real-world object; next three objects)	**161**	Interprets a pattern (repeating; same rule, different objects; AAB; manipulatives shown; geometric shapes)	**166**	Extends a pattern (repeating; ABC; next three numbers; numerals shown)
159	Extends a pattern (repeating; ABB; next three numbers; letters	**162**	Extends a pattern (repeating; ABC; next three numbers;	**168**	Extends a pattern (repeating; ABCD; next object; mani

3-column, 10 pt RIT Band PGID Report:



Skills and Concepts to Enhance (73% Probability*) 151 - 160		Skills and Concepts to Develop (50% Probability*) 161 - 170		Skills and Concepts to Introduce (27% Probability*) 171 - 180	
Attributes, Patterns, and Functions		Attributes, Patterns, and Functions		Attributes, Patterns, and Functions	
151	Extends a pattern (repeating; AB; next two objects; numerals shown)	**161**	Interprets a pattern (repeating; same rule, different objects; AAB; manipulatives shown; geometric shapes)	**171**	Extends a pattern (repeating; ABC; next two objects; manipulatives shown; geometric shapes)
155	Illustrates the repeating portion of a pattern (AAB; manipulatives shown; geometric shapes)	**162**	Extends a pattern (repeating; ABC; next three numbers; numerals shown)	**172**	Interprets a pattern (repeating; same rule, different objec ABB; manipulatives shown; real-world objects; geometric

NWEA recommends that PGID be used as one source along with other classroom information or district and state assessments to guide instructional planning.

 © 2010-2012 NWEA

Purpose and Uses

The purpose of PGID is to help guide instruction, based on the reports from MPG Survey with Goals tests. PGID may enhance an instructor's ability to provide appropriate instruction for individual students or groups of students. PGID has many uses, and NWEA encourages educators to explore these uses.

Suggested uses for PGID include:

- **Monitor Student Progress**—Educators can use PGID to monitor student progress on a continuum of learning for each reported goal category area sampled in the tests.
- **Develop Individual Education Plans**—Educators can focus on setting learning goals with students. PGID can help identify specific skills to support the student in reaching targeted goals.
- **Facilitate Parent Conferencing**—PGID provides a way for instructors to communicate with parents about their child's academic progress. When parents understand how test scores translate into the skills and concepts their child needs, they can encourage activities that support classroom learning.
- **Track Continual Growth**—MPG Survey with Goals test questions are calibrated on the same scales as the questions used in Measures of Academic Progress (MAP tests for grade 2 through high school). When students transition to standard MAP tests, instructors use DesCartes: A Continuum of Learning® to guide instruction. Instructors can track learning and growth, as early as kindergarten and continuing through high school.
- **Track Specific Skills**—After identifying areas of strengths and/or concerns, instructors use the appropriate Skills Checklist assessment to pinpoint specific skills for further instruction.

 © 2010-2012 NWEA

Understanding the PGID

PGID statements come directly from the calibrated questions in the MPG Survey with Goals tests; they appear in columns according to the selected RIT range. These statements reflect the cognitive complexity of the question or questions they represent, and any context or format within the question(for example, audio use and ability to manipulate objects on the screen). Instructors can choose to view the relevant objectives according to:

- Reported goal categories
- Sub-goal categories
- Topics
- RIT score

Every test question represented by a PGID statement has been calibrated to determine the RIT difficulty value. The calibration is a result of data gathered in a field-testing process that embeds two or more non-calibrated questions into a regular test (for example, the MPG Survey with Goals test). Responses to these questions do not add or subtract from a student's score. But how the students perform on the field test questions, and each student's overall score on the calibrated questions, are used to anchor field test questions to the NWEA RIT scale.

The final calibrations are highly reliable, but every score or calibration has a certain margin of error. The NWEA calibration process strives to minimize this margin of error.

Still, it is important to consider the standard error of measurement when aligning PGID statements with a student's overall or reported goal category scores.

As the number of calibrated test questions in the MPG Survey with Goals assessments increases, so will the number of PGID statements.

 © 2010-2012 NWEA

MAP for Primary Grades Combined Tests

MPG Survey with Goals tests are organized into six reported goal categories.

If an individual student's goal range scores differ within a test by 8 or more RIT score points, the goal range scores should be used as entry points to the PGID for reported goal categories.

Each goal area is further divided into sub-goals. Both the NWEA standard and the Common Core goal structures are described in the following tables.

 © 2010-2012 NWEA

Reading Goal Structure

Each reported goal area contains sub-goal categories.

Content of test: Primary Grades Reading

Table 3: NWEA Standard Reading Tests Goals

Phonological Awareness	Vocabulary and Word Structure
▪ Phoneme Identification ▪ Blending ▪ Rhyming ▪ Manipulation of Sounds and Syllabication	▪ Sight Words ▪ Content Vocabulary and Context Clues ▪ Synonyms, Antonyms, Homonyms, Homographs, Homophones ▪ Base Words, Prefixes, Suffixes ▪ Compound Words, Contractions
Phonics	**Comprehension**
▪ Consonants ▪ Vowel Patterns ▪ Spelling Patterns and Rhyming ▪ Letter-Sound Manipulation and Syllabication in Written Words	▪ Literal Comprehension ▪ Interpretive Comprehension ▪ Evaluative Comprehension
Concepts of Print	**Writing**
▪ Developmental Reading Skills ▪ Developmental Writing Skills ▪ Environmental Print	▪ Writing Process ▪ Conventions of Language ▪ Language Structure, Phrase, Sentence, Paragraph ▪ Grammatical Patterns

Table 4: Common Core Reading Tests Goals

Foundational Skills	Literature and Informational
▪ Phonics and Word Recognition ▪ Phonological Awareness ▪ Print Concepts	▪ Informational Text: Key Ideas, Details, Craft, Structure ▪ Literature: Key Ideas, Craft, Structure
Language and Writing	**Vocabulary Use and Functions**
▪ Capitalize, Spell, Punctuate ▪ Language: Grammar, Usage ▪ Writing: Purposes: Plan, Develop, Edit	▪ Language: Context Clues and References ▪ Vocabulary Acquisition and Use

 © 2010-2012 NWEA

Mathematics Goal Structure

Each reported goal area contains sub-goal categories.

Content of test: Primary Grades Math

Table 5: NWEA Standard Mathematics Tests Goals and Sub-goals

Problem Solving	Measurement and Geometry
▪ Understand and Represent Problems ▪ Solution Strategies and Verification of Answers ▪ Logic, Reasoning, Conjectures, and Proof	▪ Attributes, Compare and Order, Appropriate Tool and Unit ▪ Measure Using Standard and Non-standard Units, Estimation ▪ Identification, Attributes, and Relationships — Lines, 2-D Figures, and 3-D Figures ▪ Locations, Visualizations, Spatial Relationships, Transformations, Symmetry, and Congruence
Number Sense	**Statistics and Probability**
▪ Count ▪ Identify and Represent: Whole Numbers and Basic Fractions ▪ Relative Position and Magnitude ▪ Place Value and Base-Ten System	▪ Data Collection, Organization, and Display ▪ Data Analysis ▪ Probability and Predictions
Computation	**Algebra**
▪ Addition ▪ Subtraction ▪ Readiness for Multiplication and Division	▪ Attributes, Patterns, and Functions ▪ Understanding Algebraic Concepts ▪ Application of Algebraic Concepts

Table 6: Common Core Mathematics Tests Goals and Sub-goals

Operations and Algebraic Thinking	Measurement and Data
▪ Represent and Solve Problems ▪ Properties of Operations	▪ Solve Problems Involving Measurement ▪ Represent and Interpret Data
Number and Operations in Base Ten	**Geometry**
▪ Counting and Cardinality ▪ Understand Place Value ▪ Operations in Base Ten	▪ Reason with Shapes and Their Attributes ▪ Develop Understanding of Fractions

 © 2010-2012 NWEA