MAP Growth, MAP Growth K-2
RIT Reference Charts

Common Core and Next Generation Science Standards*
Contents

Mathematics K-2 ................................................................. 3
  Operations and Algebraic Thinking ............................................. 4
  Number and Operations .............................................................. 5
  Measurement and Data ............................................................... 6
  Geometry .................................................................................. 7

Mathematics 2-5 ..................................................................... 8
  Operations and Algebraic Thinking ............................................. 9
  Number and Operations .............................................................. 10
  Measurement and Data ............................................................... 11
  Geometry .................................................................................. 12

Mathematics 6+ ..................................................................... 13
  Operations and Algebraic Thinking ............................................. 14
  The Real and Complex Number Systems .................................. 15
  Geometry .................................................................................. 16
  Statistics and Probability ............................................................ 17

Reading K-2 ......................................................................... 18
  Literature and Informational ...................................................... 19
  Vocabulary Use and Functions ................................................... 20
  Foundational Skills ................................................................... 21
  Language and Writing ............................................................... 22

Reading .................................................................................. 23
  Literary Text: Key Ideas and Details ........................................... 24
  Literary Text: Language, Craft, Structure .................................. 25
  Informational Text: Key Ideas and Details ................................... 26
  Informational Text: Language, Craft, Structure .......................... 27
  Vocabulary: Acquisition and Use ............................................... 28

Language Usage ..................................................................... 29
  Writing: Write, Revise Texts for Purpose and Audience .............. 30
  Language: Understand, Edit for Grammar, Usage ....................... 31
  Language: Understand, Edit for Mechanics ................................ 32

Science .................................................................................... 33
  Life Sciences ............................................................................ 34
  Physical Sciences ........................................................................ 35
  Earth and Space Sciences............................................................ 36
Understanding RIT Scores and the Reference Charts

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Operations and Algebraic Thinking

Students represent and solve problems involving addition, subtraction, multiplication, and division. They understand and apply properties of operations, and they understand the relationship between operations.

Listen to the word problem.

There are four goats on the hillside. Three goats leave the hillside.

Putting an X on a goat means it has left the hillside.

Move Xs to the goats to show how many have left the hillside.

Listen to the story problem.

There is one tree in the yard. Two more get planted in the yard.

Move the trees to the yard to show how many there are altogether.

Listen to the word problem.

Bella had 78 shells in her collection. She gave 43 shells away to her friends.

How many shells are left in Bella’s collection?

You can move base ten blocks to help you solve the problem.

Listen to the word problem.

The Lions had 47 points at halftime. At the end of the game they had 89 points.

How many points did the Lions score after halftime?

How many shells are left in Bella’s collection?

Look at the problem.

Listen to the story problem.

What is the answer?

Look at the problem.

Listen to the word problem.

Two trucks and one more truck is how many trucks altogether?

Look at the problem.

The domino shows one way to make 5.

Move dots to the empty domino to show a different way to make 5.

Listen to the word problem.

There are four goats on the hillside. Three goats leave the hillside.

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How many shells are left in Bella’s collection?

Look at the problem.

Listen to the story problem.

What is the answer?
Number and Operations
Students understand place value, the counting sequence, and counting strategies. They compose and decompose numbers into hundreds, tens, and ones. Students use place value understanding to compare numbers, perform multidigit arithmetic, and develop understanding of fractions.

Look at the picture.
How many superheroes are there?

1 2 3 4

Look at the coatracks.
Choose the coatrack that has the fewest coats.

Look at the two groups.
Move cubes to the circles to make the groups equal.

Look at the numbers.
Which number is 1 more than 13?

4 14 15 17 20

Look at the number.
What is 100 more than 347?

347

Look at the numbers.
Put the correct symbol in each of the problems to make them true.

6 hundreds and 5 ones

Listen to the words that describe a number: 6 hundreds and 5 ones.
Write the number that is described.

6 hundreds and 5 ones
Measurement and Data

Students solve problems involving measurement and estimation of lengths, time, liquid volumes, and masses of objects. They use geometric measurement to understand area and perimeter. Students organize, represent, and interpret data in various graphical representations.

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141–150

Look at the sticker chart.

Which student has the most star stickers?

Gold Star Stickers

<table>
<thead>
<tr>
<th>Name</th>
<th>Stars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sarah</td>
<td>⭐⭐⭐⭐⭐</td>
</tr>
<tr>
<td>Pablo</td>
<td>⭐⭐⭐⭐⭐</td>
</tr>
<tr>
<td>Jamal</td>
<td>⭐⭐⭐⭐⭐</td>
</tr>
<tr>
<td>Cher</td>
<td>⭐⭐⭐⭐⭐</td>
</tr>
<tr>
<td>Maria</td>
<td>⭐⭐⭐⭐⭐</td>
</tr>
</tbody>
</table>

151–160

Look at the graph.

How many students chose hot dog as their favorite dinner?

<table>
<thead>
<tr>
<th>Favorite Dinner</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hamburger</td>
<td>3</td>
</tr>
<tr>
<td>Hot Dog</td>
<td>2</td>
</tr>
<tr>
<td>Hot Dog</td>
<td>1</td>
</tr>
</tbody>
</table>

161–170

Look at the picture of the bus.

Measure the length of the bus using blocks.

How many blocks long is the bus?

blocks

171–180

Look at the clock.

What time is shown on the clock?

3:45 9:15 8:20 4:40

181–190

Listen to the story.

Julia bought a robot toy for 79 cents. She paid for it with one dollar.

Show the change that Julia should receive.

above 191

Look at the rectangle.

What is the perimeter of the rectangle?

Perimeter cm

cm

cm

cm
Geometry
Students reason with shapes and their attributes. They identify and describe shapes having specified attributes. Students partition shapes into equal shares to gain an understanding of fractional parts of a whole.

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<table>
<thead>
<tr>
<th>141–150</th>
<th>151–160</th>
<th>161–170</th>
</tr>
</thead>
<tbody>
<tr>
<td>Look at the pictures. Which picture is shaped like a circle?</td>
<td>Look at the shapes. Which shape has only 3 sides?</td>
<td>Look at the objects. Choose the pyramid.</td>
</tr>
<tr>
<td><img src="image1.png" alt="triangle" /></td>
<td><img src="image2.png" alt="square" /></td>
<td><img src="image3.png" alt="cylinder" /> <img src="image4.png" alt="pyramid" /> <img src="image5.png" alt="cube" /> <img src="image6.png" alt="cone" /> <img src="image7.png" alt="sphere" /></td>
</tr>
<tr>
<td><img src="image8.png" alt="rectangle" /> <img src="image9.png" alt="circle" /> <img src="image10.png" alt="wheel" /></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>171–180</th>
<th>181–190</th>
<th>above 191</th>
</tr>
</thead>
<tbody>
<tr>
<td>Look at the shapes. Choose ALL of the shapes that are divided into equal shares.</td>
<td>Look at the objects. Choose ALL the objects that have six faces.</td>
<td>Look at the shapes. Choose ALL the shapes that show one-third shaded.</td>
</tr>
<tr>
<td><img src="image11.png" alt="triangle" /> <img src="image12.png" alt="square" /> <img src="image13.png" alt="rectangle" /></td>
<td><img src="image14.png" alt="cylinder" /> <img src="image15.png" alt="pyramid" /> <img src="image16.png" alt="cube" /> <img src="image17.png" alt="cone" /> <img src="image18.png" alt="sphere" /></td>
<td><img src="image19.png" alt="rectangle" /> <img src="image20.png" alt="triangle" /> <img src="image21.png" alt="circle" /></td>
</tr>
</tbody>
</table>

Below 131
Understanding RIT Scores and the Reference Charts

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Operations and Algebraic Thinking

Students represent and solve problems involving the four operations, understand and apply properties of operations, generate and analyze patterns, and write and interpret numerical expressions.

Choose all the sets that show an odd number of basketballs.

A. 
B. 
C. 
D. 
E. 

Jorge wants to buy enough hot dog buns for 50 hot dogs. The buns come in packages of 8. He uses this number sentence to find the number of packages he will need.

\[ 50 \div 8 = 6 r2 \]

What is the LEAST number of packages needed?

A. 6
B. 7
C. 8
D. 9

Sonja and Kai share the toys equally. How many toys will they each have?

A. 1
B. 2
C. 4
D. 8

Which set contains all the factors of 20?

A. \{2, 4, 5, 10\}
B. \{5, 10, 15, 20\}
C. \{1, 2, 4, 5, 8, 15\}
D. \{1, 2, 4, 5, 10, 20\}

Solve the expression.

\[ 6 \times (9 - 4) + (6 + 4) + 2 \]

A. 20
B. 30
C. 35
D. 38
E. 58
Number and Operations
Students understand the place value system by counting, representing, comparing, and performing operations with multidigit whole numbers, fractions, and decimals.

below 161

Use the picture to answer the question.

How many apples are there?
A. 4
B. 5
C. 6
D. 7

161–170

What number is 10 less than 46?
Move digits to the boxes to show your answer.

171–180

Find the difference.

99
- 56

A. 33
B. 34
✓C. 43
D. 44

181–190

Find the product.

60
× 5

A. 30
B. 35
✓C. 300
D. 305

191–200

Solve:

\[
\frac{5}{7} - \frac{3}{7} = \]

✓A. \( \frac{2}{7} \)
B. \( \frac{8}{7} \)
C. 2
D. 7

201–210

Use the numeral to complete the table.

612,398

Move digits to the correct place value in the boxes.

<table>
<thead>
<tr>
<th>Place Value</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>tens</td>
<td></td>
</tr>
<tr>
<td>hundreds</td>
<td></td>
</tr>
<tr>
<td>ten thousands</td>
<td></td>
</tr>
<tr>
<td>hundred thousands</td>
<td></td>
</tr>
</tbody>
</table>

211–220

Move the fractions to the correct location on the number line.

Move numbers to the boxes to show fractions that are equal to \( \frac{1}{3} \).

221–230

Move the fractions to the correct location on the number line.

\[
\frac{1}{3} = \frac{4}{10} = \frac{9}{10} = \frac{6}{10}
\]
Measurement and Data
Students solve measurement problems involving length, mass, liquid volume, time, money, area, perimeter, volume, and angles. Students generate, represent, and interpret data, and they solve problems using charts, graphs, and line plots.

**171–180**

**181–190**

**Use the figure to answer the question.**

What is the area of the figure?
A. 5 square units
B. 9 square units
C. 18 square units
**D.** 20 square units

**191–200**

**Use the rectangle to answer the question.**

What is the perimeter?
A. 6 cm
B. 5 cm
C. 6 cm
**D.** 7 cm
E. 8 cm

**201–210**

**211–220**

A flight lasted 5 hours. Choose all the measurements that are equal to 5 hours.
A. 15,000 seconds
**B.** 18,000 seconds
C. 30,000 seconds
D. 250 minutes
**E.** 300 minutes

**221–230**

The line plot shows the lengths of paper strips that Jai needs for an art project.

What is the total length of paper that Jai will use?
A. **5** inches
B. 6 inches
C. **7** inches
**D.** 8 inches

Use the figure to answer the question.

Choose all the expressions that can be used to find the volume of the rectangular prism.

**Number of Paper Strips (inches)**

What is the total length of paper that Jai will use?
A. **5** inches
B. 6 inches
C. **7** inches
**D.** 8 inches
Geometry
Students understand and reason with geometric concepts by identifying, describing, creating, and classifying lines, angles, and two- and three-dimensional figures. Students solve problems by graphing points on the coordinate plane.

Which shape is a triangle?

- A.  
- B.  
- C.  
- D.  
- E.  

Which statement about rectangles is true?

- A. All rectangles are squares.
- B. All rectangles are trapezoids.
- C. All rectangles are rhombuses.
- D. All rectangles are parallelograms.
- E. All rectangles are quadrilaterals.

Choose all the quadrilaterals.

Choose all the terms that describe the set of shapes.

- A. squares
- B. rectangles
- C. trapezoids
- D. parallelograms
- E. quadrilaterals

Some figures are shown.

Choose all the figures that show a line of symmetry.

Choose all the figures that show obtuse angles.

Which statement about rectangles is true?

- A. All rectangles are squares.
- B. All rectangles are trapezoids.
- C. All rectangles are rhombuses.
- D. All rectangles are parallelograms.

Move the shapes to the correct part of the chart.
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Operations and Algebraic Thinking

Students apply and extend previous understandings of arithmetic to algebraic expressions, equations, and inequalities. Students model relationships between quantities using functions and compare, interpret, and build functions in different representations.

**201–210**

**Simplify:**

\[5 \times (2 + 3^2) - 1\]

A. 12

\[\boxed{B. 15}\]

C. 17

D. 29

**211–220**

The graph shows the change in price of a stock over time.

**Solve:**

\[\frac{x}{4} - 31 = 108\]

A. \(x = 232\)

\[\boxed{B. x = 401}\]

C. \(x = 463\)

D. \(x = 556\)

**221–230**

The length of a certain moon's orbit is approximately \(1.5 \times 10^{11}\) meters. The diameter of a certain star is approximately \(1.5 \times 10^9\) meters.

How many times greater is the distance of the moon's orbit compared to the diameter of the star? Enter the answer in the box.

**231–240**

Move numbers into the boxes to represent 64 using an exponent.

\[\boxed{2} \quad 3 \quad 4 \quad 16 \quad 32 \quad 60\]

**241–250**

Use the system of equations to answer the question.

\[2x + 2y = 6\]

\[y = x - 5\]

What is the solution to the system of equations?

A. (1, 2)

B. (1, -4)

C. (2, 1)

D. \(\boxed{(4, -1)}\)

**above 250**

The length of a certain moon's orbit is approximately \(1.5 \times 10^{11}\) meters. The diameter of a certain star is approximately \(1.5 \times 10^9\) meters.

How many times greater is the distance of the moon’s orbit compared to the diameter of the star? Enter the answer in the box.
The Real and Complex Number Systems
Students apply and extend previous understandings of operations to real and complex number systems by solving problems involving ratios, rates, proportions, rational numbers, irrational numbers, complex numbers, and the coordinate plane.

The sign shows the cost of a bag of apples at Hank’s Fruit Stand.

What is the unit price?

✓A. $0.85 per apple
B. $0.90 per apple
C. $1.10 per apple
D. $1.18 per apple

Simone makes pies. She uses \( \frac{3}{2} \) pounds of bananas to make 12 servings of banana pie.

How many pounds of bananas does Simone need to make 48 servings of banana pie?

A. 4
B. 6
C. 10
✓D. 14

Which number line shows how to find the sum of \(-8 + (-2)\)?

A. 
B. ✓
C. 
D. 

Which is equivalent to \( 2 + 3\sqrt{-12} \)?

A. \( 8\sqrt{3} \)
B. \(-\sqrt{12} \)
C. \(-4\sqrt{3} \)
✓D. \( 2 + 6\sqrt{3} \)
E. \( 2 - 3\sqrt{12} \)
**Geometry**

Students solve problems involving area, circumference, surface area, volume, and angle measure. Students understand congruence and similarity in terms of transformations and apply theorems involving properties of circles and right triangles.

---

**201–210**

Use the scale drawing of the building to answer the question.

```
12 cm
Scale: 1 cm = 6 m
```

**What is the actual height of the building?**

- A. 2 m
- B. 6 m
- C. 72 m
- D. 144 m

---

**211–220**

Use the graph to answer the question.

The triangle is reflected across the y-axis and then reflected across the x-axis. \( P' \) is the image of \( P \) after both reflections.

**What are the coordinates of \( P' \)?**

- A. (-9, -9)
- B. (-9, -3)
- C. (-7, -9)
- D. (-7, -3)

---

**221–230**

Which net can be folded along the dotted lines to make a closed cube?

- A.
- B.
- C.
- D.
- E.

---

**231–240**

The area, \( A \), of the circle can be found using the formula \( A = \pi r^2 \), where \( r \) is the radius.

```
12 cm
```

**What is the approximate area of the circle?**

- A. 18.8 cm²
- B. 37.7 cm²
- C. 113.0 cm²
- D. 452.2 cm²

---

**241–250**

Use the diagram to answer the question.

```
3 cm
8 cm
5 cm
```

**What is the surface area of this rectangular solid?**

- A. 79 cm²
- B. 110 cm²
- C. 120 cm²
- D. 128 cm²
- E. 158 cm²

---

**above 250**

Choose all the transformations that carry the regular hexagon onto itself.

- Reflection over line \( k \)
- Reflection over line \( n \)
- Rotation 60° clockwise about \( P \)
- Rotation 90° clockwise about \( P \)
- Reflection over line \( r \)
- Reflection over line \( s \)
- Rotation 120° clockwise about \( P \)
- Rotation 270° clockwise about \( P \)
This list shows the number of points Julia scored in each of her last seven basketball games.
10, 14, 16, 12, 14, 14, 11
What is the mean number of points Julia scored?

A. 10
B. 13
✓C. 14
D. 16

Ivan places these five blocks into a bag.

Ivan picks one block without looking.
What is the probability that the block Ivan picks has a number on it?

A. \(\frac{1}{5}\)
B. \(\frac{1}{3}\)
C. \(\frac{2}{5}\)

\[\sqrt{D. \frac{3}{5}}\]

Use the box plot to answer the question.

What is the median of the data?

A. 20
B. 30
✓C. 32.5
D. 35
E. 45

The scatter plot shows data about the number of people who are working on a job and the amount of time needed to complete the job.

What type of relationship is shown between the number of people and time?

A. positive and linear
B. negative and linear
C. positive and nonlinear
D. negative and nonlinear

A student spins the spinner 50 times and records the results in the table.

Move symbols into the boxes to correctly complete the inequalities comparing the experimental probability and theoretical probability for each color.

Experimental P (Red) Experimental P (Blue) Experimental P (Yellow)
Theoretical P (Red) Theoretical P (Blue) Theoretical P (Yellow)
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Literature and Informational

Students understand what they read or hear read aloud. They make inferences, cite textual evidence, and determine central ideas, main topics, or themes. They identify and use various text features and determine or clarify the meaning of unknown words in context.

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141–150

Look at the picture.

Why does the bus stop in this picture?

It is raining.
A bike is passing.
A train is passing.
The people want to ride.

151–160

Listen to the story.

Which picture shows where the story takes place?

What does Jayna do before she eats breakfast?

161–170

Read the table of contents.

Which page has information about dogs?

171–180

Read the passage.

Choose ALL the sentences that are facts.

Skating is the best sport for kids.
Hockey is a team sport on skates.
In speed skating, racers try to finish first.
Figure skating is the most fun.

181–190

Read the passage.

Mr. Lee made lunch for his sons each day. Each son liked some foods best. The oldest son liked nuts and fruit. The middle son liked fruit and string cheese. The youngest son liked soup, fruit, and juice.

Which food did every son like?

juice  fruit  soup  nuts

above 191

Read the passage.

Birds go places other animals cannot. Robins build their nests high up in trees. There is a good reason for this. It is safer that way. Robins stay in their nests to protect their babies. But sometimes they must leave the safety of the nest. Robin parents need to find food like worms and berries. Leaving the baby robins would be dangerous if the nests were on the ground. Other animals could get to the baby birds. But since the nests are in trees, few animals can reach them. Baby robins are safer in trees than on the ground.

What is the main idea of the passage?

Birds go places other animals cannot.
Robins stay in their nests to protect their babies.
Baby robins are safer in trees than on the ground.
Robin parents need to find food like worms and berries.
Vocabulary Use and Functions

Students determine the meaning of unknown and multiple-meaning words and phrases by using context clues and analyzing word parts. They understand figurative language and word relationships. Students use glossaries and beginning dictionaries to clarify word meanings.

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131-140

Look at the pictures.
Choose the picture of the bird.

Look at the pictures.
Choose the picture of the bathtub.

141-150

Look at the pictures.
Choose the picture of something that melts.

151-160

Look at the list of fruit.
Move ALL the words that are fruits to the paper to complete the list.

161-170

Listen to the sentence.
The boy jumped down the stairs.
Which word has an ending that means something happened in the past?

171-180

Listen to the passage.
Max looked out the window on the bus ride. For just a moment, he got a glimpse of the new toy store. Very soon, the bus had passed it, and the store was out of sight again.

What does the word glimpse mean in the passage?
a new toy a quick look
a bus stop a daydream

181-190

Listen to the sentence.
Jamal had a good time at his friend’s party.
Which word shows that Jamal had more than just a good time at the party?
quiet awful
excellent boring

above 191

Which pair of words means the same thing?
get – offer define – need
require – get need – require
Foundational Skills

Students understand the organization and basic features of print. They know and apply grade-level phonics and word analysis skills in decoding words. Students demonstrate understanding of spoken words, syllables, and sounds. They isolate, manipulate, and blend individual sounds to form words.

PLEASE NOTE

MAP Growth K–2 items have audio and sometimes little or no text on the screen. The example items present the visual of the item and we include text in the examples to show what the student hears when the text is absent from the screen.
Language and Writing

Students understand conventions of standard English capitalization, punctuation, and spelling. They know conventions of standard English grammar and usage. Students develop persuasive, informative, and narrative writing by planning, revising, editing, rewriting, and adding details.

PLEASE NOTE

MAP Growth K-2 items have audio and sometimes little or no text on the screen. The example items present the visual of the item and we include text in the examples to show what the student hears when the text is absent from the screen.

141–150

Listen to the sentence: The boys are wet.

Move the words to the line to write the sentence.

are boys The wet

151–160

Read the sentence that has a circled mistake.

The word “many” is not spelled correctly. Use the letters to spell the word “many” correctly.

(audio only; text showing correct spelling is not on screen.)

Roses can have menny thorns.

161–170

Read the sentences.

Put the sentences in the best order to make a paragraph.

When they finally got home, they made an apple pie.
Gabe was busy on Sunday afternoon.
First, his mom took him to the park.
At the grocery store, Gabe chose apples.
After the park, they went to the grocery store.

171–180

Read the draft that Aziz wrote.

I think my dog Rascal is nice. His fur is nice. When he licks my face, it is nice. When we play fetch, it is nice. He cuddles with me, and that is nice. Rascal is a nice pet.

What is the best way that Aziz can make the draft better?

He can make the story shorter.
He can use the word “nice” more.
He can make the sentences shorter.
He can use other words for the word “nice.”

181–190

Read the sentences.

Put the sentences in the best order to make a paragraph.

When they finally got home, they made an apple pie.
Gabe was busy on Sunday afternoon.
First, his mom took him to the park.
At the grocery store, Gabe chose apples.
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Understanding RIT Scores and the Reference Charts

MAP Growth tests produce scores that make it possible to monitor student growth from year to year along developmental scales. The charts that follow show examples of the kinds of work students do at various points along the MAP Growth RIT scale, assuming they have been exposed to content.

Question Difficulty and the RIT Scale

These charts demonstrate the relationship between question difficulty and our RIT scale:

- For any MAP Growth score, students will answer questions at or near that score correctly about half the time.
- Questions with lower RIT will be answered correctly more frequently.
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Each subject area has a unique alignment to the RIT scale. As a result, scores between subjects are not equivalent.

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**Reading**

**LITERARY TEXT: KEY IDEAS AND DETAILS**

**LITERARY TEXT: Key Ideas and Details**

Students read and comprehend literary texts, make inferences and predictions, and draw conclusions. They determine key ideas, analyze the development of themes and ideas, and summarize.

**PLEASE NOTE** Some passages have been truncated due to space considerations.

---

**below 161**

**Read the story.**

Mother was ready. She had streamers and balloons. She baked a cake. She invited Sandy’s friends. She asked them not to tell Sandy. Sandy would come home from school. Her friends would shout when she turned on the lights!

What is Sandy’s mother planning?
1. Sandy’s first day at school  
2. a picnic in the backyard  
✓ 3. Sandy’s surprise party  
4. a trip to the bakery

---

**161–170**

**Read the passage.**

I can’t wait for winter vacation to start! Every day feels like a holiday! I love to have snowball fights with my friends and make snowmen in the yard. (Passage continues.)

**Which word best describes how the author feels about winter vacation?**
1. calm  
2. excited  
3. nervous  
✓ 4. tired

---

**171–180**

**Read the paragraph.**

Gordon loves to visit his aunt and uncle in Vermont. He goes up every summer to visit them. They live on a houseboat on the lake. (Passage continues.)

What does Gordon like to do best?
1. swim in the lake  
2. fish for perch and trout  
3. read books on the boat deck  
✓ 4. steer the boat around the lake

---

**181–190**

**Read the passage.**

The wind whipped the tops of the trees so they looked like they were dancing. Clouds raced across the sky. Leaves and bits of paper swirled around. (Passage continues.)

**Which sentence best tells what the story is about?**
✓ 1. There is a big rainstorm coming.  
2. They are having fun in the snow.  
3. There is a double rainbow in the sky.  
4. They are cleaning up after a big storm.

---

**191–200**

**Read the passage.**

Molly stared out the bus window with blank eyes. Next to her, a woman pulled herself up. She got off at the next stop. Molly looked over and saw that the woman had left something on the seat. (Passage continues.)

**What was Molly’s first reaction when she picked up the wallet?**
1. to look at the pictures  
2. to call after the woman  
3. to stare out the bus window  
✓ 4. to turn it in to the bus driver

---

**201–210**

**Read the passage.**

Celina’s eye glanced around in disgust. Everywhere she looked there was trash. A crushed aluminum soda can discarded over here. An empty crumpled-up chip bag tossed over there. It made her red with rage. Celina finally took a deep breath and slowly trudged into the grocery store.

“Hey, Celina, what’s wrong?” the owner of the store, Mrs. Jones, asked. (Passage continues.)

**Which is the most likely theme of this passage?**
1. Kids are usually very smart.  
2. It is better to follow than lead.  
3. People litter without knowing it.  
✓ 4. Everyone can make a difference.

---

**211–220**

**Read the passage.**

He lived on the bank of a mighty river, broad and deep, which was always silently rolling on to a vast undiscovered ocean. It had rolled on, ever since the world began. It had changed its course sometimes, and turned into new channels, leaving its old ways dry and barren. (Passage continues.)

(from “A Leaf in the Storm” by Marie Louise de la Rameé)

**What is a central idea of this passage?**
1. It is hard to swim against the tide.  
2. The river supports life on its banks.  
3. Earth will continue to circle around the Sun.  
✓ 4. The flow of the river to the ocean is unchanging.

---

**221–230**

**Read the passage.**

Bernadou clung to his home with a dogged devotion. He would not go from it to fight unless compelled, but for it he would have fought like a lion. (Passage continues.)

(from “A Leaf in the Storm” by Marie Louise de la Rameé)

**Based on the passage, which statement about Bernadou is most likely true?**
1. Bernadou had traveled to the capital of his country many times.  
2. Bernadou was a drifter, never spending much time in any one place.  
✓ 3. Bernadou would fight with loyalty and fierceness for any good cause.  
4. Bernadou felt a strong connection to his hometown, but not his country.

---

**above 230**

**Read the passage.**

Elizabeth Bennet had been obliged, by the scarcity of gentlemen, to sit down for two dances; and during part of that time, Mr. Darcy had been standing near. (Passage continues.)

(from Pride and Prejudice by Jane Austen)

**How is Elizabeth Bennet influenced by the dialogue between Mr. Darcy and Mr. Bingley?**
1. Because Elizabeth overhears Mr. Darcy’s insulting comments, she insists on sitting alone rather than dance with him.  
2. Elizabeth discovers that Mr. Darcy’s refusal to dance is due to his shy nature and forgives his behavior.  
✓ 3. Despite believing that Mr. Darcy is impolite and self-important, Elizabeth maintains an upbeat attitude.  
4. Elizabeth develops a new, playful sense of humor around Mr. Darcy to draw him out of his foul mood.
Read the passage.

Scott opened his eyes and looked at the clock. He pulled the blankets over his head to keep the sun out. He yawned and closed his eyes. He just wanted to go back to sleep.

What does the author’s description tell the reader about Scott?

1. He is lazy.  
2. He is tired.  
3. He is scared.  
4. He is hungry.

✓ 2. He is tired.

What does Maria do first?

1. She puts on her coat.  
2. She eats her breakfast.  
3. She walks to the bus stop.  
4. She puts her book in her backpack.

✓ 2. She eats her breakfast.

How do readers learn about Laura?

1. from what Laura looks like  
2. from what other characters say  
3. from what Laura says to others  
4. from descriptions of Laura’s feelings

✓ 3. from what Laura says to others

What do Mike and Dave do right after playing outside?

1. They race down the hill.  
2. They fall asleep on the couch.  
3. They have grilled cheese and soup.  
4. They pull their sleds up the big hill.

✓ 3. They have grilled cheese and soup.

What is the best title for this passage?

1. A Pilot’s Life  
2. A Safe Landing  
3. The City Airport  
4. One Cloudy Night

✓ 2. A Safe Landing

How does the setting contribute to Takoda’s main problem in the story?

1. He is unable to see clearly through dust from the valley floor.  
2. He is unable to find shelter from threatening weather on the valley floor.  
3. The valley does not provide him with the nourishment he needs for his journey.  
4. The valley does not provide him with an easy way to avoid the buffalo stampede.

✓ 4. The valley does not provide him with an easy way to avoid the buffalo stampede.

What does the use of alliteration in line 13 build meaning in the poem?

1. It highlights the eeriness of the snow’s frosty appearance.  
2. It emphasizes the images of destruction caused by the snow.  
3. It accentuates the completeness of the snow’s coverage, layer by layer.  
4. It contrasts the quietness of the fallen snow with the sounds of harvest.

✓ 3. It accentuates the completeness of the snow’s coverage, layer by layer.

Which statement best expresses the meaning of the extended metaphor that compares hope to a bird throughout the poem?

1. Hope is a constant presence and gives people comfort.  
2. Hope flies away like a bird during storms and difficult times.  
3. Hope is demanding, like a bird that constantly needs to be cared for.  
4. Hope tries to sing songs that are uplifting but forgets the words to them.

✓ 2. Hope flies away like a bird during storms and difficult times.
READING | INFORMATIONAL TEXT: KEY IDEAS AND DETAILS

Informational Text: Key Ideas and Details
Students read and comprehend informational texts, making inferences and predictions, drawing conclusions, and citing textual support. They determine the central idea, analyze the development of arguments, and summarize.

PLEASE NOTE Some passages have been truncated due to space considerations.

below 161

Read the passage.
Many kinds of dogs live in the world. Some have been around for a long time. (Passage continues.)

What do Mudas like?
1. other dogs
2. sleeping all day
3. living in the city
✓ 4. having work to do

161–170

Read the passage.

We see a scientist working in a lab. She is using a microscope. She is looking at small objects that are too small to see with the naked eye. She is studying the microorganisms that cause disease. She is trying to find a cure for these diseases. (Passage continues.)

What type of day is needed to make mud pies?
✓ 1. a sunny day
2. a rainy day
3. a snowy day
4. a cloudy day

171–180

Read the paragraph.

A hen lays about one egg a day. A chick takes three weeks to be born from an egg. (Passage continues.)

When do chicks start peeping?
1. after three weeks
 ✓ 2. after two weeks
3. after one week
4. after four weeks

181–190

Read the passages.

Passage 1

Cotton is a type of plant. The cotton plant grows from seeds. Then the plants grow flowers. After the flowers fall off, green pods—or bolls—are left. The bolls dry out in the sun. They burst open. White fluffy cotton pops out.

Passage 2

Cotton is a soft cloth that comes from a plant. White bolls of cotton are washed and stretched into long strings. The strings are twisted together to make a thread. (Passage continues.)

What are both passages about?
1. clothes
✓ 2. cotton
3. flowers
4. plants

191–200

Read the paragraph.

Platinum is a silver-white metal that is even more valuable than gold. It will not corrode or tarnish as many metals do when exposed to air. (Passage continues.)

‘catalyst:’ a substance that can speed up or bring about a chemical reaction without being affected itself.

According to the passage, why is platinum valued by jewelers?
✓ 1. It is rarer than gold.
2. It is good for gem settings.
3. It can be used as a catalyst.
4. It is produced in many countries.

201–210

Read the paragraph.

We observe today not a victory of party but a celebration of freedom—symbolizing an end as well as a beginning—signifying renewal as well as change. For I have sworn before you and Almighty God the same solemn oath our forbears prescribed nearly a century and three-quarters ago. (Passage continues.)

Which statement best expresses the main idea of the passage?
✓ 1. Well-equipped armies will fight to defend freedom.
2. Global alliances are the key to freedom for all people.
✓ 3. The responsibilities of freedom rest with the individual.
4. The past generations have secured freedom for the future.

211–220

Read the passage.

Benjamin Franklin: More than a Writer

Many people today use bifocals, eyeglasses that aid people’s vision for objects both near and far away. Some people use cast-iron wood-burning stoves to heat their homes. (Passage continues.)

Which aspect of the passage best supports the idea that Franklin was a creative visionary?
✓ 1. the danger associated with Franklin’s famous kite-flying experiment.
2. the mention of Franklin’s role in writing the Declaration of Independence
3. the example of the wide range of inventions that Franklin developed
4. the similarities between today’s bifocals and the bifocals that Franklin invented

221–230

Read the passage.

The efficiency of a book is like that of a man, in one important respect: its attitude toward its subject is the first source of its power. A book may be full of good ideas well expressed, but if its writer views his subject from the wrong angle even his excellent advice may prove to be ineffective. (Passage continues.)

Which conclusion about becoming an effective speaker can be drawn from the passage?
✓ 1. Effective speaking is the result of study followed by earnest practice.
2. Effective speaking requires training in and adherence to a specific set of rules.
✓ 3. Effective speaking requires self-discipline and personal conviction about the topic.
4. Effective speaking is the result of practicing the speeches and styles of noted speakers.

above 230
Informational Text: Language, Craft, Structure

Students analyze the structure of informational texts, evaluating texts for bias and for the quality of claims and evidence. They evaluate the author’s craft, determining the author’s point of view and purpose.

PLEASE NOTE Some passages have been truncated due to space considerations.

161–170

**Read the chart.**

<table>
<thead>
<tr>
<th>Favorite Sports</th>
<th>Baseball</th>
<th>Basketball</th>
<th>Soccer</th>
<th>Swimming</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neha</td>
<td>Max</td>
<td>Sarah</td>
<td>Adrienn</td>
<td>Cody</td>
</tr>
<tr>
<td>Jessica</td>
<td>Samuel</td>
<td>Brandon</td>
<td>Julie</td>
<td></td>
</tr>
</tbody>
</table>

Which sport do the most children like?

✅ 1. soccer
2. baseball
3. basketball
4. swimming

**Read the chart.**

<table>
<thead>
<tr>
<th>Music</th>
<th>Piano</th>
<th>Drum</th>
<th>Bass</th>
<th>Guitar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jazz</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Pop</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rock</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Country</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Which two types of music have the most instruments in common?

1. Jazz and pop
2. Pop and rock
3. Country and jazz
4. Country and rock

171–180

**Read the passage.**

The best place to go on vacation is Florida. There are beautiful beaches, large hotels, good restaurants, and interesting shops. (Passage continues.)

What is the author’s opinion of Florida?

1. Florida has no variety.
2. The weather is too hot.
✅ 3. Florida is a great place to visit.
4. Only boaters will enjoy Florida.

181–190

**Read the passage.**

Robin Hood? Which explanation is the most likely reason the author includes a chapter heading in this passage?

1. The story is about a boy.
2. The chapter is about Robin Hood.
3. The author is interested in Robin Hood.
4. The author is not interested in Robin Hood.

**Read the passage.**

A Unique Creature: The Thorny Devil

The thorny devil is a very interesting and unusual creature. From its name, one might guess that it is large and scary. (Passage continues.)

Which sentence reveals the author’s opinion of the thorny devil?

1. sentence 2
2. sentence 3
3. sentence 4
4. sentence 5

191–200

**Read the report excerpt.**

Over the last century, the amount of precipitation has increased significantly across eastern parts of North America. (Passage continues.)

Which feature of this text most assures the validity of the information?

1. the vocabulary
2. the author’s tone
3. the use of citations
4. the use of percents

201–210

**Read the passage.**

Based on the descriptions in the two reviews, on which topic are the two reviewers most likely to agree?

1. the quality of the plot
2. the details of the setting
3. the overall quality of the movie
4. the main character’s personality

211–220

**Read the text written by a company that organizes scientific research into a database.**

Our Mission: Our database of more than 3,000 articles of documented investigations is an easy-to-use tool for scientific research. Users may look for a general topic or narrow their search through the use of three topic code parameters. (Passage continues.)

**Read the chart.**

<table>
<thead>
<tr>
<th>Topic Code Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Context</td>
<td>Who conducted the research? Where was it conducted?</td>
</tr>
<tr>
<td>Method</td>
<td>How was the research conducted? What procedures were used?</td>
</tr>
<tr>
<td>Findings</td>
<td>What was observed? What results were achieved?</td>
</tr>
</tbody>
</table>

How does the chart complement the text?

1. It summarizes the text.
2. It provides detail not in the text.
3. It serves to contrast information in the text.
4. It provides a transition between the two parts of the text.

221–230

**Read the chart.**

<table>
<thead>
<tr>
<th>Music</th>
<th>Piano</th>
<th>Drum</th>
<th>Bass</th>
<th>Guitar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jazz</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Pop</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rock</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Which two types of music have the most instruments in common?

1. Jazz and pop
2. Pop and rock
3. Country and jazz
4. Country and rock

230 above

**Read the passage.**

Happy Birthday, Maudie is a delightful movie. The characters are believable, and the plot is a tender love story. (Passage continues.)

Review 1

Don’t bother to see Happy Birthday, Maudie; it’s a sappy movie about a girl who lets everyone push her around. (Passage continues.)

Review 2

Based on the descriptions in the two reviews, on which topic are the two reviewers most likely to agree?

1. the quality of the plot
2. the details of the setting
3. the overall quality of the movie
4. the main character’s personality
**Vocabulary: Acquisition and Use**

Students recognize and understand word relationships and structures. They use context clues and reference materials to decipher word meaning and nuance.

**PLEASE NOTE** Some passages have been truncated due to space considerations.

---

**below 161**

**Read the words.**

- ball
- doll
- puzzle
- top

**To which group do these words belong?**

1. animals
2. colors
3. places
4. toys

---

**161–170**

**Use the sentences and the glossary to answer the question.**

Dinah and her sister went to the market. They saw many kinds of produce. Dinah wanted peas. Her sister wanted strawberries.

**Glossary**

- market: a place to sell food
- produce: fruits and vegetables

**What is another kind of produce?**

1. apples
2. cookies
3. money
4. trees

---

**171–180**

**Read the sentences.**

Jackie couldn’t believe how much fun she had on the field trip. She kept replaying the day’s events in her mind on the bus ride back to school.

**In the word **replaying**, what does the prefix **re** mean?**

1. after
2. again
3. not
4. two

---

**181–190**

**Read the paragraph and dictionary entries.**

Mrs. Franz had just given her students a piece of clay the size of her hand. She told them to create something. (Passage continues.)

**Dictionary**

- scuba (skoo-buh) n. equipment used to breathe underwater
- scullery (skuhl-er-ee) n. a small room near the kitchen
- sculpture (skuhlp-chur) n. an object created by carving or molding
- scum (skuhm) n. a covering on the surface of a liquid

**Based on the information in the paragraph, what is the meaning of the word **sculpture**?**

1. slimy film
2. large pantry
3. piece of art
4. swimming gear

---

**191–200**

**Read the sentences.**

Lightning ______ the trunk of the lilac tree. I was ______ by the beauty of the sunset.

**Which word can be used in both sentences?**

1. bent
2. flashed
3. struck
4. surprised

---

**201–210**

**Which set of words all have the same root word?**

1. extra, relax, index
2. contain, restrain, plain
3. here, everywhere, there
4. knowledge, unknown, knowing

---

**211–220**

**Read the sentence.**

Although the storm outside was **ferocious**, Nate left the comfort of the cabin and trudged toward home.

**Which word best matches the connotative meaning of **ferocious** as it is used in the sentence?**

1. barbaric
2. inhuman
3. intense
4. untamed

---

**221–230**

**Read the sentence and dictionary entry.**

The lives saved when the volcano exploded **vindicated** the expensive early warning system.

**Dictionary**

- vindicate (vin-di-keyt) v.
  1. to free from an accusation
  2. to justify based on evidence
  3. to defend against opposition
  4. to claim for oneself or for someone else

**Which definition of **vindicate** is used in the sentence?**

1. definition 1
2. definition 2
3. definition 3
4. definition 4

---

**above 230**

**Based on an understanding of Latin roots, what is the meaning of **ambidextrous**?**

1. walks quickly
2. before the flood
3. lives on land and in water
4. can use both hands equally well
Understanding RIT Scores and the Reference Charts

MAP Growth tests produce scores that make it possible to monitor student growth from year to year along developmental scales. The charts that follow show examples of the kinds of work students do at various points along the MAP Growth RIT scale, assuming they have been exposed to content.

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Choose the word that will best help create a funny story, and move it into the blank.

One morning Anna could not find her hat. She felt very _______when she discovered that her hat was on her head the whole time! Even Jasper the dog seemed to giggle.

busy fine happy **** silly

Celine is writing a story about a trip to the train station. Her teacher said to use words that describe the sounds at the train station.

Which sentence should Celine add to her story?

✓ 1. An engine thundered down the track and clattered to a stop.
2. Two children waited on a bench and played with their toys.
3. A man rushed through the station carrying a big suitcase.

Derrick is writing a science report about the moons of Jupiter.

Which source of information will be most useful to Derrick?

✓ 3. a book that names and describes the moons of each planet
2. a science-fiction movie about life on one of Jupiter’s moons

**PLEASE NOTE** Some passages have been truncated due to space considerations.
**Language: Understand, Edit for Grammar, Usage**

Students understand the conventions of grammar and usage.

---

<table>
<thead>
<tr>
<th>161–170</th>
</tr>
</thead>
</table>
| **Read the sentence.**  
I went with my mom to buy a ______ of bananas.  
Which word best completes the sentence?  
✓ 1. bunch  
2. group  
3. pile  
4. set |

---

<table>
<thead>
<tr>
<th>171–180</th>
</tr>
</thead>
</table>
| **Read the paragraph, and choose the correct word in each pair of words.**  
The ice cream truck comes to our apartments every Friday. My mom says buying ice cream from the ice cream truck was one of her favorite parts of *[child]/√[childhood]*. We run outside when we hear the truck playing its song. Mom buys an ice cream sandwich, and we split it in half. Then we sit in the sunshine to eat our ice cream sandwich. It fills us both with *[happier]/√[happiness]* to share an ice cream. |

---

<table>
<thead>
<tr>
<th>181–190</th>
</tr>
</thead>
</table>
| **Read the sentence.**  
The dog ______ in the house.  
Which word belongs in the blank?  
1. am  
2. is  
3. are  
4. were |

---

<table>
<thead>
<tr>
<th>191–200</th>
</tr>
</thead>
</table>
| **Which sentence uses adjectives in the correct order?**  
1. A wool dusty coat is hanging in the closet.  
✓ 2. A tiny yellow butterfly is landing on the flower  
3. A wooden small ship is sailing toward the island  
4. A brown young horse is trotting around the field |

---

<table>
<thead>
<tr>
<th>201–210</th>
</tr>
</thead>
</table>
| **Read the sentence fragment.**  
Each penguin in the pool.  
Which change makes the fragment a complete sentence?  
1. Each penguin in the deep pool.  
✓ 2. Each penguin in the pool swam.  
3. Each and every penguin in the pool.  
4. Each little penguin in the deep pool. |

---

<table>
<thead>
<tr>
<th>211–220</th>
</tr>
</thead>
</table>
| **Read the sentence.**  
Suzanne and Marissa ______ an entire afternoon at the amusement park.  
Which verb phrase uses active voice to complete the sentence?  
✓ 1. had the chance to spend  
2. are being invited to spend  
3. have been chosen to spend  
4. were given an invitation to spend |

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<th>221–230</th>
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| **Read the draft of Talia’s paragraph.**  
The tallest mountain in the world is Mount Everest. Its elevation is 29,035 feet. It was summited in 1953 for the first time.  
Talia wants to combine these statements into one sentence.  
Which sentence best combines these statements?  
1. The tallest mountain, at 29,035 feet, in the world is Mount Everest and it was first summited in 1953.  
2. The tallest mountain in the world, Mount Everest (29,035 feet peak elevation), was first successfully summited in 1953.  
✓ 3. Mount Everest, the tallest mountain in the world with an elevation of 29,035 feet, was summited in 1953 for the first time.  
4. First successfully summited in 1953, the tallest mountain, Mount Everest, in the world has a peak elevation of 29,035 feet. |

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| **Which sentence shows clear pronoun-antecedent agreement?**  
1. We unpacked our books from the boxes and then returned them to the office.  
2. As soon as the monkeys left their cages, the janitors cleaned them.  
3. Samantha put her jacket in the locker room and then forgot where it was located.  
✓ 4. For English class, the students had to memorize a monologue by their favorite playwright. |
Which sentence is punctuated correctly?
1. Do flowers bloom in the spring!
✓ 2. Do flowers bloom in the spring?
3. Do flowers bloom in the spring,
4. Do flowers bloom in the spring.

Read the sentence, and then choose the word that should begin with a capital letter.
My art teacher gave the note to Mrs. Keegan.

Which word in the sentence should be capitalized?
1. leaves
2. color
✓ 3. september
4. weather

What is the correct spelling for more than one cherry?
✓ 1. cherries
2. cherryes
3. cherrys
4. cherryses

Which sentence correctly uses quotation marks?
2. “My sister said, I need a bedtime story.”
✓ 3. Mom said, “Brush your teeth before bed.”
4. “Mom,” I asked, can I have a glass of water?”

Read the sentence.
Maple leaves begin to turn color in September when the weather is cooler.

Which underlined word should be capitalized?
✓ 1. southwest
2. north
3. northern
4. northeast

Proofread Carla’s paragraph.
I live in an area known as the great southwest—in Taos, New Mexico. Taos is a town well known for its art, history, and recreation. Located just north of the Santa Fe National Forest, Taos offers visitors the chance to ski during the winter months. There are also several museums whose goal it is to preserve artwork from the northern part of New Mexico. There are even more options for exploration nearby; Taos is only 40 miles northeast of Santa Fe, the capital of New Mexico.

Which underlined word should be capitalized?
✓ 1. southwest
2. north
3. northern
4. northeast

Students understand the conventions of punctuation, capitalization, and spelling.
Understanding RIT Scores and the Reference Charts

MAP Growth tests produce scores that make it possible to monitor student growth from year to year along developmental scales. The charts that follow show examples of the kinds of work students do at various points along the MAP Growth RIT scale, assuming they have been exposed to content.

Question Difficulty and the RIT Scale

These charts demonstrate the relationship between question difficulty and our RIT scale:

- For any MAP Growth score, students will answer questions at or near that score correctly about half the time.
- Questions with lower RIT will be answered correctly more frequently.
- Questions of higher RIT will be answered correctly less frequently. More difficult questions will probably require new learning on the part of the student.

PLEASE NOTE

Each subject area has a unique alignment to the RIT scale. As a result, scores between subjects are not equivalent.

Test items in this booklet are sample items, and many have not been calibrated or field tested. For purposes of this document, RIT scale alignment is an approximation.
Life Sciences

Students demonstrate understanding of the ideas about the structure and processes of organisms, how matter and energy move through ecosystems, how heredity affects organisms, and how biological evolution affects the unity and diversity of life. Students also demonstrate their understanding of science and engineering practices and of crosscutting concepts.

A student observes frogs in and near a pond for a year. He discovers a pattern in the way they change during their lives.

Which changes did the student most likely observe during the year?

Students collect this information about zebra mussels to better understand how they affect other populations.

Zebra mussels are small filter-feeding animals similar to clams. They are native to Russia. They were accidentally introduced into the Great Lakes of the United States. Since then, their population has increased and spread into the Mississippi River.

What is a major concern that biologists have about the increase and spread of the zebra mussel population?

Some tissues that make up the circulatory system are composed of muscle cells.

Why is muscle tissue necessary for the circulatory system to perform its functions?

A group of chipmunks live in a student’s backyard. The student observes the chipmunks in the yard all summer but does not see them during the winter.

Why does the student see the chipmunks only in the summer?

This ecological pyramid represents the relative amount of available energy at each trophic level in the marine ecosystem.

How does differentiation at the cellular level affect an organism as a whole?

How does the law of conservation of energy apply to this ecosystem?

What is the chance that an offspring of this cross will be short?

Students make a Punnett square to predict the outcome of the cross.

What is the best chance for survival in an ocean environment?

A student observes frogs in and near a pond for a year. He discovers a pattern in the way they change during their lives.

Which changes did the student most likely observe during the year?

Students collect this information about zebra mussels to better understand how they affect other populations.

Zebra mussels are small filter-feeding animals similar to clams. They are native to Russia. They were accidentally introduced into the Great Lakes of the United States. Since then, their population has increased and spread into the Mississippi River.

What is a major concern that biologists have about the increase and spread of the zebra mussel population?

A. Mussels feed on fish that humans consume.
B. Mussels release too much oxygen into the water.
C. Mussels produce too much food through photosynthesis.
D. Mussels feed on tiny organisms that are food for other species.

Some tissues that make up the circulatory system are composed of muscle cells.

Why is muscle tissue necessary for the circulatory system to perform its functions?

A. Muscle tissue provides strength and support for body movements.
B. Muscle tissue regulates the movement of blood through the body.
C. Muscle tissue allows communication between the brain and spinal cord.
D. Muscle tissue produces the white and red blood cells that are needed for circulation.

How does differentiation at the cellular level affect an organism as a whole?

A. Body cells repeatedly divide to allow an organism to get larger in size.
B. Cells divide and replace old or damaged cells to maintain the systems of an organism.
C. Germ cells divide into female or male sex cells to transfer genetic information to other organisms.
D. Stem cells form different types of cells to allow the development of all systems in a growing organism.
Physical Sciences

Students demonstrate understanding of the ideas about the interactions of matter, the relationship between force and motion, how energy converts and transfers, and the nature and use of waves. Students also demonstrate their understanding of science and engineering practices and of crosscutting concepts.

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Emilio is preparing lemonade. He first mixes 100 g of lemon juice with 400 g of water. He then adds 200 g of sugar.

How much does the lemonade weigh?

A. 200 g  
B. 400 g  
C. 500 g  
D. 700 g  

Correct Answer: D. 700 g

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Students designed and built this marble roller coaster. The only constraints are that the marble must start at rest from a height of 20 cm. Their design failed; the marble did not get over the hill before the finish.

How should the students redesign their roller coaster?

A. The start should be closer to the hill so the marble rolls down a steeper slope and gathers more kinetic energy.  
B. The start should be farther from the hill so the marble can build up more kinetic energy as it approaches the hill.  
C. The start should be lower than the top of the hill so the marble has less potential energy and more kinetic energy.  
D. The start should be higher than the top of the hill so the marble has more potential energy to be converted to kinetic energy.

Correct Answer: D. The start should be higher than the top of the hill so the marble has more potential energy to be converted to kinetic energy.

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Students are investigating to see how sound can be produced. The pictures show the actions they will test.

What will the students most likely find out about the actions? Move a result to each picture.

A. Does not make a sound  
B. Makes a sound

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Students make this model of two electrically charged balloons.

Model 1

Which description best describes what happens next to each student? (Assume no loss of energy due to friction between the skates and the floor.)

A. Both students will move backward. Student A will move twice as fast as Student B.  
B. Both students will move backwards with the same speed because the force is applied to both.  
C. Student A will move backward. Student B will remain stationary because he has the most mass.  
D. Student B will move backward. Student A will remain stationary because he provided the force.

Correct Answer: A. Both students will move backward. Student A will move twice as fast as Student B.
Earth and Space Sciences
Students demonstrate understanding of the ideas about the history of Earth in terms of the Universe, the Solar System, and the fossil record; Earth’s systems including the cycling of matter, plate tectonics, weather, and climate; and how Earth is affected by human activity. Students also demonstrate their understanding of science and engineering practices and of crosscutting concepts.

Students are making a model of the Sun and Earth to explain the causes of natural, long-term variation in climate.

Show the position of the Sun in the sky at 6 A.M., 12 noon, and 6 P.M. in March by dragging the three Suns to the correct boxes.

In May, a student observes the constellation Virgo in one area of the sky. One month later, the student observes the constellation Bootes in the same area of the sky.

Why does the student observe the constellation Virgo in May and then Bootes in June?
A. Stars fade in and out
B. Earth rotates on its axis
C. Stars revolve around the Sun
D. Earth revolves around the Sun

Students want to develop a plan for their school yard that will help the ecosystem.

Which plan will help the ecosystem?
A. Plant native plants to reduce water runoff
B. Remove ants and earthworms from the yard
C. Use more fertilizer in the school garden to grow more food
D. Leave food out for animals such as raccoons, deer, and coyotes

Tornadoes tend to form in areas with unstable air masses.

Which sentence best explains the relationship between air masses and tornadoes?
A. Tornadoes form in areas with cool air masses because cool air is more dense than warm air.
B. Tornadoes remove moisture from air masses, causing warm, humid air masses to change into cool, dry air masses.
C. The interaction between stable and unstable air masses results in an increase of warm, humid air masses where tornadoes often form.
D. The interaction between cool, dry air masses and warm, humid air masses causes instability in the atmosphere that can result in tornadoes.

The graph shows changes in the atmosphere.

How will the trends in temperature and carbon dioxide in the graph most likely impact other Earth systems?
A. The change in global temperatures will cause an increase in the size of the polar ice caps.
B. The change in global temperatures will cause an increase in the size of the hole in the ozone layer.
C. The change in the amount of carbon dioxide in the atmosphere will cause the ocean to be more acidic.
D. The change in the amount of carbon dioxide in the atmosphere will cause an increase in the respiration by animals.
E. None of the above

Students are making a model of the Sun and Earth to explain the causes of natural, long-term variation in climate.

Wind blows sand into a woman's garden.

The woman will put new plants between the garden and the beach to keep sand out of the garden.

Which plants would best block the wind and sand?
A. Vegetables she can eat
B. Thick bushes
C. Plants with strong, deep roots
D. Tall trees with high branches

The graph shows changes in the atmosphere.

How will the trends in temperature and carbon dioxide in the graph most likely impact other Earth systems?
A. changes in the direction of the rotation of Earth
B. changes to the shape of the annual orbit of Earth
C. changes in the gravitational pull of the Sun and Earth
D. changes to the angle of the axis of Earth relative to the Sun
E. changes to the angle of the plane of the orbit of Earth around the Sun