RISING GRADE 7

Math Teacher Guides

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RedThread™
A Lavinia Mathematics Program

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Priority Standards

RISE Summer Program prioritizes **10** key standards per grade to focus on during summer school. These standards have been selected from the major Common Core clusters designated by Achieve the Core. These standards are addressed through a combination of Math Routines and Story Problems. The Rising Grade 7 prioritized standards are:

- **6.RP.A.1:** Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *For example,* "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."
- **6.RP.A.2:** Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship. *For example,* "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is ¾ cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger."
- **6.RP.A.3***: Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
- **6.NS.A.1:** Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.
- **6.NS.C.6:** Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.
- **6.NS.C.7:** Understand ordering and absolute value of rational numbers.
- **6.EE.A.1:** Write and evaluate numerical expressions involving whole-number exponents.
- **6.EE.A.3:** Apply the properties of operations to generate equivalent expressions. *For example,* apply the distributive property to the expression $3(2 + x)$ to produce the

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equivalent expression $6 + 3x$; apply the distributive property to the expression $24x + 18y$ to produce the equivalent expression $6(4x + 3y)$; apply properties of operations to $y + y + y$ to produce the equivalent expression 3y.

- **6.EE.A.4:** Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *For example,* the expressions $y + y + y$ and $3y$ are equivalent because they name the same number regardless of which number y stands for.
- **6.EE.B.6*:** Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

**Designates standards that are covered solely through Story Problems.*

Program Materials

- Chart paper
- Chart markers
- Document camera (optional)
- Projector
- Class set of whiteboards and markers OR notebooks and pencils

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Routines Overview

Which One Doesn't Belong?

Purpose

There are no right or wrong answers when it comes to this routine. Students develop their ability to reason and justify their choices, and they use their reasoning to prove why an image does not belong with the other images. This routine explores attributes of numbers, shapes, and graphs, while providing students with an opportunity to demonstrate their knowledge of math vocabulary.

Intellectual Preparation

Transferable Takeaway: Based on your students' understanding and work, choose the transferable takeaway that you want to develop through the "Which One Doesn't Belong?" routine. For example:

- Using what students know about shape attributes (e.g., number of sides, number or size of angles, lengths of sides) to defend why a shape does not belong.
- Using what students know about multiples and factors to explain why a number does not belong.

Routine Structure (15 min.)

Launch: Display the four images. Provide time for students to look at the images and decide which one of the images does not belong. Each image has a reason not to belong, so give students time to think through their reasoning.

Identification of Student Choices: Have each student identify the image they believe does not belong by writing it down on a whiteboard, holding up a number, or going to a corner of the room.

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Questioning: Once students have formed their opinions, ask students the following questions:

- What do you notice about all the images?
- What do you notice is similar? What do you notice is different?
- Which images would you group together?
- Which image would you say does not belong with the other images?
- Why do you think that?
- Does anyone think a different image does not belong? Why?

Representation: As students share their thinking, write down their reasoning about why certain images do not belong so students can discuss the different rationales.

Check for Understanding: Assess students' ability to justify their reasoning by showing another image and having students identify on their whiteboard or on a sheet of paper which image does not belong and why.

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Quick Images

Purpose

To encourage students to see amounts in a variety of ways. Through the "Quick Images" routine, students deepen their number sense as they compose and decompose to determine an amount of objects, rather than having to count each individual object.

Intellectual Preparation

Transferable Takeaway: Based on your students' understanding and work, choose a transferable takeaway that you want to develop through the "Quick Images" routine. For example:

- Rising Grades 1–3: I can use what I know about doubles to help determine the amount.
- Rising Grades 4–6: I can identify the amount in an array by knowing the number of rows and columns and using what I know about addition and multiplication.
- Rising Grades 7–9: I can use what I know about coordinate planes and negative numbers to identify the coordinates of a point.

Preparation: Choose a string of about 3 to 5 quick images that will allow students to reach the transferable takeaway through their discussion of how they see a given amount.

- Rising Grades 1–3: dot images, 10-frames, pictures, rekenrek
- Rising Grades 4–6: base-10 blocks, arrays, fractions
- Rising Grades 7–9: number lines, coordinate planes, ratios, data sets

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Routine Structure (15 min.)

Launch: Briefly, for 3 to 5 seconds, show an image under a document camera, on chart paper, or by using a projector. Students should have enough time to see but not count the amount.

Questioning: As you show each image, ask students the following questions:

- How many did you see? How did you see the amount?
- Did anyone see a different amount?
- How do you know the amount is correct?
- Did anyone see the amount in a different way?
- Repeat with the next image in the string and encourage students to see if any of the previous images can help them determine the new amount they see.

Representation: As students share their thinking, represent by circling or marking up how they saw the amount on the image so students can see the different ways a number can be composed and decomposed.

Check for Understanding: Assess student understanding by showing one last image and having students identify on their whiteboard or on a sheet of paper how many they see and how they saw the amount.

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Today's Number

Purpose

Students deepen their number sense by discovering different ways to represent and make the number of the day or by answering different questions related to the number of the day.

Intellectual Preparation

Transferable Takeaway: Based on your students' understanding and work, choose the transferable takeaway that you want to develop through the "Today's Number" routine. For example:

- Any number plus 0 equals that number.
- In addition or multiplication, we can switch the order of the numbers and still get the same sum or product.
- Fractions might have different numerators and denominators but equivalent values.

Preparation: Strategically choose a number of the day that will encourage students to compose and decompose the number in a variety of ways, and solve in as many ways as they can. Choose either structure:

- **Option 1:** Ask students to write as many equations as they can that equal the number of the day. Give them 5 minutes to work.
- **Option 2:** Provide students with the number of the day and ask them a variety of questions related to the number. For example:
  - How can you use three addends to make today's number?
  - How many tens are in today's number?
  - What is today's number in relation to your age?
  - What is one number that is greater than today's number? What is one number that is less than today's number?
  - What is 10 more/10 less than today's number? What is 100 more/100 less than today's number?

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Routine Structure (15 min.)

Launch (3 min.): Provide students with today's number and let them know if they will be creating equations that are equal to today's number or answering questions related to the number.

Work Time (5 min.): Have students write as many equations as they can or answer questions related to the number. Circulate as students work to decide what to share during the Discourse.

Discourse (7 min.): Choose 2 or 3 equations or questions to share with the class that drive toward the targeted transferable takeaway. Discuss their similarities and differences.

Check for Understanding: Assess student understanding by giving them a different number and encouraging them to use the targeted transferable takeaway to write an equation that equals that number.

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