

Critical Questions for Investigations Grade 3

Mathematical Thinking

Investigation 1: What's a Hundred?

1 How Much is 100?	How did you count to 100? (CU, SP)
2,3 Working with 100 Assessment	Is there a way to double – check our counts? (RL)

Investigation 2: Doubles and Halves

1 Pattern Blocks Assessment	What is a strategy for remembering doubles? (SP)
2 Strategies for Addition Assessment	What do you notice about the list? (SP, RL)
3,4 Finding Doubles and Halves	Which combinations are you working on and what are your clues? (CU)
5,6,7 Doubling with Money Assessment	How did you solve the double problem? (CU, SP)

Investigation 4: Exploring Odds and Evens

1 Adding Odds and Evens	What happens when you add two odd numbers? Why? (RL)
2 Odds and Evens on the Calculator Assessment	Which number split evenly and which don't? Why? (RL, SP)
3 What We've Learned About Odds and Evens Assessment	What was easy or hard for you during this unit? (CU)

Things That Come in Groups

Investigation 1: Things That Come In Groups

1 Many Things Come In Groups	How do you know your (partner's) solution is correct?(RL)
2 How Many In Several Groups? Assessment	What is the relationship between addition and multiplication? (CU)
3 Writing and Solving Riddles Assessment	What does it mean to multiply? Can you give an example?(CU,RL)
4 Each Orange Had 8 Slices	How did you solve the problems? (CU)

Investigation 2: Skip Counting and 100 Charts

1 Highlighting Multiples In 100 Charts	What patterns do you see? (CU, RL)
2 Using the Calculator to Skip Count Assessment	How could you use the calculator to figure which numbers make groups of ____?(SP, RL)
3,4 More Practice with Multiples Assessment	How can you use your 100 chart to find the answer to 8×4 ?(SP)
5,6 Discussing Number Patterns	What patterns do you see in the 12's chart?(CU)

Investigation 3: Arrays and Skip Counting

1,2 Arranging Chairs Assessment	What are all the factors of 12? (SP)
3,4 Array Games	What pairs do you still need to work on? Which do you already know?(CU)
5 The Shapes of Arrays Assessment	How could you write that as a division problem? (SP)

Investigation 4: The Language of Multiplication and Division

1,2 Multiply or Divide? Assessment	How many ways can you write a division sentence? Give examples. (SP)
3,4 Writing and Solving Story Problems	What is the relationship between multiplication and division? (CU, RL)

Investigation 5: Problems with Larger Numbers

1 Calculating Savings	What are some patterns you notice?(CU)
2 Many, Many Legs	How many legs would there be on all the four-legged animals? (SP)
3 Data Tables and Line Plots	What does the line plot tell us? (CU)
4 A Riddle with 22 Legs (Assessment)	How did you solve the problem? (SP, CU)

Flips, Turns and Area

Investigation 1: Motions with Tetrominoes

1 Tetrominoes	How can you tell if two shapes are congruent? (SP)
2,3 Slides, Flips, and Turns Assessment	What are slides, flips, and turns? (CU)
4 Rectangles with Different Shapes	Are the different shapes for rectangles all “fair”? Why or why not? (RL)
5 Final Challenges Assessment	At the Star level, you can’t use flips. Are flips really ever needed? Why? (SP, RL)

Investigation 2: Finding Area

1 Triangles and Squares Assessment	When would you need to measure the area of something? (SP)
2,3 A Poster of Four-Unit Shapes Assessment	Create a shape with an area of 6 that is not a rectangle. (SP)
4,5 Writing About Area Assessment	Calculate the area for a 12-by-5 rectangle? What strategy did you use? (SP, CU)

From Paces to Feet

Investigation 1: Measuring with Paces and Steps

1 Giant Steps and Baby Steps	How do giant steps compare to baby steps? (CU)
2 Pacing and Comparing	What is a pace? How does a pace compare to giant steps and baby steps? (SP, CU)
3,4 Robot Directions Assessment	Why do the directions work for some people but not all? (MC)
5,6 Finding the Middle-Sized Pace Assessment	How can we find the middle sized pace? (SP)

Investigation 2: From Paces to Feet

1 The Need for a Standard Measure Assessment	Why is it important to have a standard measure? (CU, MC)
2 Kids Feet and Adults Feet	What is the typical foot length in our class? (CU)
3,4 Measuring Centers Assessment	How do you keep track of the units when you measure? (CU)
5 Moving to Metric Assessment	What could you use to measure centimeters if you didn't have a ruler? (CU)
6,7 Metric Measurement Assessment	What are some things to remember to measure accurately? (CU)

Investigation 3: Measuring Projects: Do Our Chairs Fit Us?

1 What's a Good Fit?	How does collecting and organizing data help us to analyze a situation? (CU, MC)
2,3 Do Our Chairs Fit Us?	What is a recommendation you would make based on the data we collected? (CU, RL)

Landmarks in the 100's

Investigation 1: Finding Factors

1 Skip Counting with Cubes	How do you know if this number “works?” (RL)
2,3 Factors of 24, 36, and 48 Assessment	How do you know what comes next? (RL)
4,5 Factors of 100	How do you know if you have found all the numbers? (RL)
6,7 Dividing a Dollar Assessment	How many 20's are in 100? How many 4's are in 100? Prove that you are correct. (RL, MC)

Investigation 2: Using Landmarks to Solve Problems

1,2,3 Moving Beyond 100 Assessment	How did you double-check your counting strategy? (RL)
4 Solving Problems with Money	How did you represent your problem? (CU)
5,6 Real-World Multiplying and Dividing	What is a problem you created? What did you find? (SP, CU)

Investigation 3: Constructing a 1000 Chart

1 A 1000 Chart	How many more ____ do you need? How do you know? (SP,RL)
2,3 Finding Large Quantities Assessment	How far is it from ____ to ____? How did you solve it? (SP,RL)

Combining and Comparing

Investigation 1: Comparisons with Record Numbers

1,2 How Many Children In Your Family?	How far over 100 is your total? How do you know? (SP, RL)
3 More Record Comparisons	What is your strategy for finding the difference? (CU)

Investigation 2: How Much Heavier or Lighter?

1 Weighing Fruits and Vegetables	What is the difference between the starting weight and the second weight? What caused that to happen? (RL, MC, CU)
2 Comparing the Weights Assessment	What would happen to the weight if you left an apple out for a month and then reweighed it? (RL)

Investigation 3: Adding with Money, Inches and Time

1, 2 Heights and Coupons	What strategies did you use to find the sum or difference in the activity? (SP, CU)
3 Planning a Party Assessment	What is your strategy for double checking your work? (RL)

Investigation 4: Working with Hundreds

1 Handfuls of Beans	What does the line plot tell you? (CU, MC)
2 More Handfuls	See question on pg. 50 "Suppose you can hold 150 beans in your right hand and 217 beans in your left hand..." (SP)
3,4 Hundreds of Paper Clips	Subtract 7 paper clips from 700, the total number of clips of some boxes. How many paper clips are there now? (SP, CU)

Investigation 5: Calendar Comparisons

1 How Much Longer?	How much longer until...? (SP)
2,3 School Days	What method do you use to keep track? (CU)

Measurement Activities

Investigation 1: Metric Stations

1,2 Metric Stations	What are benchmarks for 1 meter, 10 centimeters, 500 grams, 1 kilogram, and 1 liter?
---------------------	--

Investigation 2: Scavenger Hunt

1 The Hunt	What kinds of tools are used to measure and what to they do?
------------	--

Investigation 3: Metric Olympics

1,2 Olympic Games	When is it important to measure exactly and when would an estimate be enough?
-------------------	---

Turtle Paths

Investigation 1: Paths and Lengths of Paths

1 Walking Paths	Draw the following path: (use grid paper) fd6, lt90, fd5 Finish the commands so that it creates a closed shape. (SP)
2 Commanding the Turtle	What was hard/easy about working on the computer today? (CU)
3,4 Mazes and Maps Assessment	How did you figure out how far to move the turtle? (SP, RL, CU)

Investigation 2: Turns in Paths

1,2 Turns	Estimate a 30, 60 and 90 degree turn on a piece of paper. (RL)
3 Turns, Turtles, and Triangles	Which turns were particularly hard for you to measure? Why? (CU, RL)
4 Equilateral Triangles Assessment	What is an equilateral triangle? (CU)
5,6 Missing Measures Assessment	How did you find the missing lengths and turns? (CU, SP)

Investigation 3: Paths with the Same Length

1,2 The 200 Steps	Is it possible to make a shape of 200 turtle steps with four 90 degree turns that is not a rectangle? (SP, RL, CU)
3,4,5 Facing Problems Assessment	What is perimeter? How could you figure out the perimeter of a rectangle if one side was 4" and the other was 2"? (SP)

Up and Down the Number Line

Investigation 1: Net Changes

1,2 Elevator Trips Up and Down	Is the starting position important? Why or why not?
3,4 Many Ways to Make One Net Change	Explain one strategy you used or just learned to play the game.
5 Thirty Changes	How do you keep track of partial calculations? Is it efficient? Why or why not?
6,7 Missing Information Problems	Does it matter what order your changes are in to get to the total effect? Why or why not?
8 Stopping at Many Floors (excursion optional)	What kinds of number combinations make the elevator stop at as many floors as possible?

Investigation 2: Representing Elevator Trips

1 Graphing Elevator Trips	How did you decide what trip each graph represented?
2,3 Repeating Elevator Trips	How can you tell where the elevator starts to repeat?
4 Plus and Minus Graphs	What have you learned about line graphs?

Investigation 3: Inventing Board Games

1 Playing A Board Game	Why is it important to have conventions when creating a number line?
2, 3 Creating a Board Game	What was easy or hard for you during this unit? Why?

Fair Shares

Investigation 1: Sharing Brownies

1, 2 Making Fair Shares Assessment	Order these fractions from the smallest to the largest. $\frac{1}{3}$, $\frac{1}{2}$, $\frac{1}{6}$, $\frac{1}{4}$ (SP)
3,4 More Brownies to Share Assessment	Identify the numerator. What is it telling us? $\frac{2}{3}$ (CU)

Investigation 2: Pattern Block Cookies

1,2 Making Cookie Shares	What are two ways to make $\frac{1}{2}$? (SP)
3 Comparing Shares Assessment	Prove that $\frac{1}{2}$ is larger than $\frac{1}{4}$. (RL, CU)
4 The Fraction Cookie Game*	What is a fraction that is equivalent to $\frac{1}{2}$? How do you know? (SP, RL)
5,6 Backward Sharing	Why do you think only an even number of people get shares with halves? (CU, RL, MC)
7 Half Yellow (Optional)	How do you know that exactly half your design is yellow? (RL, CU)

Investigation 3: Other Things to Share

1,2 How Can We Split Balloons?	Share \$5.00 equally with a friend. How much would each of you get? (SP, CU, MC)
3 Sharing Many Things	Find $\frac{1}{3}$ of 40 beads, to show how many beads each of 3 people could have. (SP, CU)