STMath | ST Math®
Instructional Software

ST Math: Trial
Scope and Sequence
with Standards Alignment

Common Core

Using This Document

This ST Math: Trial Scope and Sequence contains an Objectives List and relevant Common Core Standards.

- ✓ **Objectives List:** List of games in each objective including game descriptions and standards alignment.
- ✓ **Direct Coverage:** Indicates that the objective exercises part or all of the standard.
- ✓ **Supporting Coverage:** Indicates that the objective exercises developing or inferred aspects of the standard.

Scope and Sequence with Standards Alignment
Common Core TRIAL Edition

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STMath K-6
Trial Syllabus

Understanding the Syllabus

Default Objectives - The standards-based ST Math objectives assigned and sequenced by default for the grade level. Default objectives must be completed (exception is Challenge) for students to attain 100% Syllabus Progress.

Optional Objectives - The ST Math objectives that include opportunities for extension, intervention and additional practice. The teacher may assign these optional objectives, however, they do not count toward the student's Syllabus Progress or Standards Mastery.

Note: Objectives in **bold** are included in the ST Math Trial.

Kindergarten

- **Exploring Shapes**
- **Numbers and Objects to 5**
- Subitizing
- **Numbers and Objects to 10**
- Analyzing Shapes
- **Greater Than, Less Than, Equal To**
- **Understanding Addition & Subtraction within 5**
- Numbers and Objects to 20
- Introduction to the Number Line
- **Understanding Addition & Subtraction within 10**
- Making 10 and Number Pairs
- **Comparing Numbers**
- Numbers and Counting to 100
- **Sorting and Classifying**
- Foundations of Place Value
- Measurable Attributes
- Composing Shapes
- Position
- Reasoning with Attributes
- Addition and Subtraction Facts within 5
- **Challenge**
- Position LI
- Exploring Patterns
- Advanced Patterns
- Concepts of Time

Grade 1

- Introduction to the Number Line
- Subitizing
- **Addition and Subtraction within 10**
- Measurement Concepts
- Counting to 100
- **Addition, Subtraction and Equations**
- Roll, Stack, Wedge
- Foundations of Place Value
- **Number Pairs and Making 10**
- **Counting by Tens**
- Counting with Groups
- Counting to 120
- Place Value Concepts
- **Addition and Subtraction Situations with Unknowns**
- **Equal Shares and Partitioning**
- **Shape Differences**
- Composite Shapes
- Adding and Subtracting by Tens
- Using Place Value to Add
- Comparing Two-Digit Numbers
- Organizing Data
- Telling Time
- **Addition and Subtraction Within 20**
- **Challenge**
- Position LI
- Equal Shares and Partitioning LI
- Two-Digit Number Words
- Comparing Numbers

Grade 2

- **The Number Line**
- Skip Counting
- Counting with Groups
- **Addition and Subtraction Situations**
- Measurement
- **Operations on the Number Line**
- Recognizing Shape Attributes
- Addition and Subtraction Situations within 100
- **Two-Step Situations**
- Place Value Concepts
- Comparing Three-Digit Numbers
- Adding and Subtracting Tens and Hundreds
- Using Place Value to Add and Subtract
- Counting to 1,000
- **Equal Groups**
- Rows and Columns
- **Partitioning**
- Place Value Bundles - Ten and Hundred
- Composing Ten and Hundreds
- Decomposing Tens and Hundreds
- **Identifying Shapes**
- Creating Graphs
- Line Plots
- Money
- Time
- **Three-Digit Number Words**
- **Addition and Subtraction within 100**
- **Challenge**
- Addition and Subtraction Facts within 20
- Money, Extended
- Partitioning LI
- Temperature and Capacity
- Foundations of Place Value
- Comparing Two-Digit Numbers

Grade 3

- **Multiplication Concepts**
- **Division Concepts**
- Multiplication and Division Situations
- **Multiplication and Division Relationships**
- **Concepts of Area and Perimeter**
- Place Value Concepts
- Rounding Three-Digit Numbers
- **Fraction Concepts**
- Fractions on the Number Line
- Comparing Fractions
- **Number Patterns**
- Multiplication
- Division
- Place Value Bundles - Ten and Hundred
- Addition and Subtraction with Regrouping
- Volume and Weight
- Scale and Measurement in Graphing
- **Shapes**
- **Unknowns in Two-Step Problems**
- Time to the Minute
- Intervals of Time
- Addition and Subtraction within 1,000
- **Challenge**
- Shape Attributes
- Operations on the Number Line
- Patterns and Functions
- Temperature and Capacity
- The Number Line
- Skip Counting
- Four-Digit Place Value
- Place Value Bundles - Ten, Hundred, Thousand

Grade 4

- **Patterns in Number and Shape**
- Factors and Multiples
- Place Value
- Using Place Value
- Rounding Whole Numbers
- Comparing Whole Numbers
- **Mixed Numbers**
- **Fractions - Equivalence and Ordering**
- **Angles and Triangles**
- Applying Area and Perimeter
- **Adding and Subtracting Fractions**
- Adding and Subtracting Fractions LI
- Fraction Multiples
- Lines of Symmetry
- Exploring Lines and Shapes
- Parallel Lines and Parallelograms
- **Advanced Shapes**
- **Multiple Operations**
- Fraction and Decimal Equivalence
- Comparing Decimals
- Multi-Digit Multiplication
- Multi-Digit Division
- **Measurement and Conversions**
- Addition and Subtraction within 1,000,000
- **Challenge**
- Using Data and Graphs
- Multiplication Concepts
- Division Concepts
- Algebraic Expressions and Equations
- Temperature and Capacity
- Addition and Subtraction with Regrouping

Grade 5

- **Volume**
- Whole Numbers
- The Number Line
- The Coordinate Plane
- Shapes and Properties
- **Using Parentheses**
- **Patterns and Relationships**
- Multi-Digit Multiplication
- Multi-Digit Division
- **Fraction and Decimal Concepts**
- **Fractions on the Number Line**
- Unlike Denominator Concept and Strategies
- Unlike Denominator Addition and Subtraction
- Decimal Place Value
- Comparing with Decimals
- Rounding Decimals
- **Fraction Multiplication**
- **Fraction Division**
- **Angles**
- The Coordinate Plane, Extended
- Addition and Subtraction with Decimals
- Multiplying with Decimals
- Dividing with Decimals
- Converting Measurements
- **Challenge**
- Area of Polygons
- Using Data and Graphs
- Adding and Subtracting Fractions
- Adding and Subtracting Fractions LI
- Addition and Subtraction with Regrouping
- Parallel Lines and Parallelograms
- Temperature and Capacity

Grade 6

- **Negative Numbers**
- Coordinates and Distances
- Proportional Reasoning
- **Percents**
- **Unit Rates, Tables and Graphs**
- Applying Rates and Ratios
- Factors and Multiples
- **Properties of Operations**
- **Using Parentheses**
- **Solving One-Step Equations**
- **Linear Relationships**
- **Exponents**
- Division Algorithm
- Fraction Division
- Decimal Addition and Subtraction
- Area of Polygons
- Decimal Multiplication
- Decimal Division
- Mean, Median, Mode, and Range
- **Challenge**
- Visual Fraction Concepts
- Fractions on the Number Line
- Comparing and Equivalent Fractions
- Fraction Addition and Subtraction
- Fraction Multiplication
- Fraction Decimal Equivalence
- Unlike Denominator Concept and Strategies
- Unlike Denominator Addition and Subtraction
- Decimal Place Value

MIND Research Institute

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Exploring Shapes

Game Name	Game Description
Roll Off	Identify the shapes that will roll away. Shapes that are not round get stuck and block JiJi's path.
Block Stack	Identify which objects can be stacked. Shapes that are not rectangular will roll away or cause the stack to topple.
Wedge	Identify the objects that can be used to move the barrier. Shapes that are not triangles will block JiJi's path since they cannot wedge themselves under the barrier.
Match Shape	Match shapes to their outlines to clear JiJi's path. This game introduces basic geometric shapes and the ideas of direction and position.
Prisms and Cylinders	Identify the shape of the base or side of a prism or cylinder.

Common Core Standards Coverage:

Direct:

K.G.4 **Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/"corners") and other attributes (e.g., having sides of equal length).**

Supporting:

K.MD.3 Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.

K.G.1 Identify shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid").

K.G.2 Correctly name shapes regardless of their orientations or overall size.

K.G.3 Identify shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid").

Numbers and Objects to 5

Module 1: Objects to 5

Game Name	Game Description
Dot Count	Count the number of objects that appear in a set by clicking on each object once. Students learn to count to five.
Match Count	Match a given set of shaded circles with a set of empty circles. This game teaches counting and one-to-one correspondence.
How Many Legs?	Provide the correct number of shoes for each set of creatures.

Module 2: Numbers To 5

Game Name	Game Description
Number Sticks	Learn the number symbols (0-5) and the quantities they represent.
Number Objects	Represent a numerical symbol (1-5) as a set of objects and provide the number that describes the size of a given a set of objects.
Dot Count LI	Count the number of objects that appear in a set by clicking on each object once.
Ten Frame Count	Relate numerical symbols (1-5) to their representations with ten frames.

Common Core Standards Coverage:

Direct:

K.CC.2 **Count forward beginning from a given number within the known sequence (instead of having to begin at 1).**

K.CC.5 **Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects.**

Supporting:

K.CC.1 Count to 100 by ones and by tens.

K.CC.3 Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).

K.CC.4a When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.

K.CC.4b Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted.

K.CC.4c Understand that each successive number name refers to a quantity that is one larger.

Kindergarten

K.OA.1	Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.
K.OA.2	Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.

Understanding Addition and Subtraction within 5

Module 1: Addition

Game Name	Game Description
Push Box Addition	Identify the total number of boxes. This game teaches addition by combining stacks of boxes.
Select Box Addition	Add using visual models and numerals.
Bird Expressions Addition	Add the number of new birds that arrive to find the total number of birds.
Select Box Addition LI	Add using visual models and numerals.

Module 2: Subtraction

Game Name	Game Description
Push Box Subtraction	Determine how many boxes are needed to create a bridge. Watch out for holes in the ground which remove boxes. This game teaches subtraction via the removal of boxes by holes in the ground.
Select Box Subtraction	Subtract using visual models and numerals.
Bird Expressions Subtraction	Identify how many birds are left on the wire after some of them fly away. This game relates numbers to quantities and teaches subtraction.
Select Box Subtraction LI	Subtract using visual models and numerals.

Common Core Standards Coverage:

Direct:

K.OA.1 **Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.**

K.OA.2 **Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.**

K.OA.3 **Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 + 1).**

K.OA.4 **For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.**

K.OA.5 **Fluently add and subtract within 5.**

Addition and Subtraction Within 10

Module 1: Addition

Game Name	Game Description
Select Box Addition	Add using visual models and numerals.
Push Box Addition	Identify the total number of boxes. This game teaches addition by combining stacks of boxes.
Push Box Addition LI	Identify the total number of boxes. This game teaches addition by combining stacks of boxes.
Select Box Addition LI	Add using visual models and numerals.
Ten Frame Addition	Practice addition facts using ten frames.

Module 2: Subtraction

Game Name	Game Description
Push Box Subtraction	Determine how many boxes are needed to create a bridge. Watch out for holes in the ground which remove boxes. This game teaches subtraction via the removal of boxes by holes in the ground.
Pie Monster	Use the model to solve subtraction problems.
Basic Fact Subtraction	Practice addition and subtraction facts using visual models and numerals.
Basic Fact Subtraction LI	Practice addition and subtraction facts using visual models.
Pie Monster LI	Use the model to solve subtraction problems.

Common Core Standards Coverage:

Direct:

1.OA.8 Determine the unknown whole number in an addition or subtraction equation relating to three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 + ? = 11, 5 = _ – 3, 6 + 6 = _.

Supporting:

1.OA.5 Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).

1.OA.6 Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14); decomposing a number leading to a ten (e.g., 13 – 4 = 13 – 3 – 1 = 10 – 1 = 9); using the relationship between addition and subtraction (e.g., knowing that 8 + 4 = 12, one knows 12 – 8 = 4); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13).

1.NBT.4 Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.

Counting by Tens

Module 1: Counting by Tens 1

Game Name	Game Description
Hundreds Pit	Skip count from a given number less than 90 by various amounts.
Counting by Ones on the Hundreds Chart	Use a hundreds chart to count on by ones.
Counting by Tens on the Hundreds Chart	Use a hundreds chart to count on by tens.
Counting by Tens on the Number Line	Add multiple tens to a given number where the sum is less than 100.

Module 2: Counting by Tens 2

Game Name	Game Description
Alien Capture with Tens	Regrouping into small ships each holding 10 aliens, count the number of aliens and record the result on ten frames.
Alien Capture Units	Count the number of aliens and the number of ships that hold 10 aliens. Numerically record the count of each.
Alien Capture Bubble Select	Bubble select the number of aliens that are shown in either a grouped format or a scattered arrangement.

Common Core Standards Coverage:

Direct:

1.OA.5 **Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).**

1.NBT.2 **Understand that the two digits of a two-digit number represent amounts of tens and ones.**

1.NBT.2a **Understand that 10 can be thought of as a bundle of ten ones — called a "ten."**

1.NBT.2c **Understand that the numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).**

1.NBT.4 **Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.**

1.NBT.5 Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.

Supporting:

1.OA.6 Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14); decomposing a number leading to a ten (e.g., 13 – 4 = 13 – 3 – 1 = 10 – 1 = 9); using the relationship between addition and subtraction (e.g., knowing that 8 + 4 = 12, one knows 12 – 8 = 4); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13).

1.NBT.1 Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.

1.NBT.6 Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

Shape Differences

Game Name	Game Description
Pick Geometric Shapes 2D	Identify the number of edges and vertices on two-dimensional shapes.
Shape Names	Identify the given polygon.
Pick Geometric Shapes 2D LI	Learn the names and number of edges of different polygons.
Find the Pair	Given a set of two-dimensional shapes, identify the two that have the same number of vertices.
Prisms and Cylinders	Pick the shape that is the base of a given prism.
Pick Geometric Shapes 3D/2D with Vertices	Identify the number of edges and vertices on two-dimensional shapes.

Common Core Standards Coverage:

Direct:

1.G.1 Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.

Supporting:

1.G.2 Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.

Challenge

Game Name	Game Description
Dot Shapes	Connect dots to form shapes which will fill holes in the ground.
Attribute Transform	Choose the correct attribute to change (shape, color, or size) to transform the first shape into the second. This game teaches the idea of a function in a visual way.
Ice Caves	Identify lines of symmetry in two-dimensional shapes.
Bird Brain	Find birds in a grid after a sequence of transformations.
Big Seed	Find a sequence of actions that will unfold the given image into the desired shape.
Kick Box	Use lasers and mirrors to move the spheres out of the way so JiJi can pass.
Upright JiJi	Find a sequence of rotations to move JiJi into an upright position.

The Number Line

Game Name	Game Description
Number Line Journey	Move left and right on the number line to locate the given number.
Number Line Trap	Estimate the location of whole numbers between 0 and 20 on the number line.
Number Line Journey Zoom	Zoom in on the number line to locate the given number.
Number Line to 100	Estimate the location of a two-digit whole number on the number line.
Number Line to 100 Bubble Select	Write numerals within 100 on the number line.

Common Core Standards Coverage:

Direct:

2.MD.6 Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram.

Supporting:

2.NBT.2 Count within 1000; skip-count by 5s, 10s, and 100s.

2.NBT.3 Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.

Addition and Subtraction Situations

Game Name	Game Description
Push Box	Identify the total number of boxes. This game teaches addition by combining stacks of boxes.
Pie Monster	Use the model to solve addition problems. Includes missing addend.
Ten Frame Addition	Learn numerals and addition facts using ten frames.
Push Box Subtraction	Determine how many boxes are needed to create a bridge. Watch out for holes in the ground which remove boxes. This game teaches subtraction via the removal of boxes by holes in the ground.
Pie Monster Subtraction	Use the model to solve subtraction problems. Includes missing subtrahend or minuend.
How Many More?	Describe the difference between two whole numbers using the words less, greater, and equal.
More or Less: Compare Situation	Order whole numbers as greater than, less than, or equal to without the use of symbols. This game relates ordering two sets of objects to ordering whole numbers and uses a visual method to teach the concepts of greater than, less than, and equal to.

Common Core Standards Coverage:

Supporting:

2.OA.1 Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

2.OA.2 Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.

2.NBT.5 Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

2.NBT.6 Add up to four two-digit numbers using strategies based on place value and properties of operations.

2.NBT.7 Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.

2.NBT.9 Explain why addition and subtraction strategies work, using place value and the properties of operations.

Equal Groups

Module 1: Equal Groups

Game Name	Game Description
Tug Boat	Rearrange the boats so that the bridge will open. This game teaches addition, subtraction, and the concept of equal amounts.
Bouncing Shoes	Determine how many instances of a given animal are needed to fill the boots.
Fruit Monster	Determine how many pieces of fruit are needed to feed the monsters. Students explore the relationship between inputs and outputs using ratios within a visual model.
Staircase	Skip count to move JiJi up the stairs. This game builds a foundation for understanding multiplication as repeated addition.
Complete Box	Represent numerical expressions using an area model.

Module 2: Even and Odd

Game Name	Game Description
Bouncing Shoes Multiple Groups	For more than one animal, find the number of instances needed to fill the boots.
Even or Odd	Learn the concept of even and odd numbers using a visual model.
Even or Odd LI	Using the terms “even” and “odd”, state the parity of the various numbers.

Common Core Standards Coverage:

Direct:

2.OA.3 **Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.**

2.OA.4 **Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.**

Challenge

Module 1: Challenge

Game Name	Game Description
Venn Space	Place the object in the correct section of the Venn diagram according to its attributes.
Dot Shapes	Connect dots to form shapes which will fill holes in the ground.
Ice Caves	Identify lines of symmetry in two-dimensional shapes.
Big Seed	Find a sequence of actions that will unfold the given image into the desired shape. Teaches the concept of symmetry and the idea of a function or transformation.

Module 2: Super Challenge

Game Name	Game Description
Attribute Transform	Choose the correct attribute to change (shape, color, or size) to transform the first shape into the second. This game teaches the idea of a function in a visual way.
Bird Brain	Find birds in a grid after a sequence of transformations.
Venn Space Pick Shape	Identify the object that has the attributes corresponding to a particular section of a Venn diagram.
Upright JiJi	Find a sequence of rotations to move JiJi into an upright position.
Kick Box	Use lasers and mirrors to move the spheres out of the way so JiJi can pass.

Multiplication Concepts

Module 1: Multiplication Concepts

Game Name	Game Description
Bouncing Shoes	Use repeated addition within the model to determine how many of one animal are needed to fill the given number of shoes.
How Many Legs?	Find the correct number of shoes for each set of creatures by counting or, in later levels, multiplying.
Bouncing Shoes LI	Use multiplication within the model to determine how many of one animal are needed to fill the given number of shoes.
Number Line Multiplication	Multiply whole numbers using a number line.

Module 2: Multiplication Concepts II

Game Name	Game Description
Build Expressions	Add and multiply whole numbers using visual models.
Repeated Expressions	Interpret a multiplication expression as repeated addition.
Grid Expressions	Represent the multiplication expression as an area model on the given grid.
Complete Box	Use the rectangular area model to build up multiplication.

Common Core Standards Coverage:

Direct:

3.OA.1 **Interpret products of whole numbers, e.g., interpret 5 x 7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5 x 7.**

3.OA.3 **Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.**

3.MD.7a **Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.**

3.MD.7b **Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.**

Supporting:

3.OA.5 Apply properties of operations as strategies to multiply and divide. Examples: If 6 x 4 = 24 is known, then 4 x 6 = 24 is also known. (Commutative property of multiplication.) 3 x 5 x 2 can be found by 3 x 5 = 15, then 15 x 2 = 30, or by 5 x 2 = 10, then 3 x 10 =30. (Associative property of multiplication.) Knowing that 8 x 5 = 40 and 8 x 2 = 16, one can find 8 x 7 as 8 x (5 + 2) = (8 x 5) + (8 x 2) = 40 + 16 = 56. (Distributive property.)

3.OA.6 Understand division as an unknown-factor problem. For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.

3.OA.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 x 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

Division Concepts

Game Name	Game Description
Equal Division	Divide blocks into equal parts.
Set Split	Divide a set of objects into two equal subsets.
Fair Sharing	Determine how many boxes each creature gets, when given a description of an equal sharing situation.
How Many Creatures?	Each creature has the same number of legs. Given the total number of legs, determine the number of creatures.
Fair Sharing LI	Determine how many boxes each creature gets and how many remain in an equal sharing game.
Build Expressions	Divide whole numbers by forming equal groups of dots.

Common Core Standards Coverage:

Direct:

3.OA.2 **Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.**

3.OA.3 **Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.**

3.OA.9 **Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.**

3.G.2 **Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.**

Supporting:

3.OA.6 Understand division as an unknown-factor problem. For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.

3.OA.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 x 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

Fraction Concepts

Module 1: Explore

Game Name	Game Description
Equal Areas	Determine which figure is divided up equally based on area.
Equal Division	Divide blocks into equal parts.
Balance Pies	Represent given fractions as circular diagrams displaying equal parts of a whole.
Pie Monster	Represent the given fraction or whole number with circles divided into equal parts.

Module 2: Fraction Notation

Game Name	Game Description
Match Fraction	Represent a given fraction using a visual model by first dividing a whole into equal parts and then shading the correct number of parts.
Fraction of Shape	Create the symbolic notation for a fraction of an irregular shape.
Crank Pies	Represent fractions as equal parts of a whole using visual models.
Alien Bridge	Represent fractions as equal parts of a whole using visual models.
Numerator Denominator	Identify the numerator and denominator of a fraction represented as a diagram, symbol, or word using the terms numerator and denominator.

Common Core Standards Coverage:

Direct:

3.G.2 **Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.**

3.NF.1 **Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size 1/b.**

3.NF.2 **Understand a fraction as a number on the number line; represent fractions on a number line diagram.**

3.NF.2a **Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line.**

3.NF.3 **Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.**

3.NF.3a **Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.**

3.NF.3b **Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3). Explain why the fractions are equivalent, e.g., by using a visual fraction model.**

3.NF.3c **Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.**

Challenge

Module 1: Challenge

Game Name	Game Description
Treasure Hunt	Help JiJi navigate around the map to find the correct destination. This game helps develop spatial reasoning by working with position and direction concepts.
Attribute Transform	Choose the correct attribute to change (shape, color, or size) to transform the first shape into the second. This game teaches the idea of a function in a visual way.
Bird Brain	Find birds in a grid after a sequence of transformations.
Big Seed	Find a sequence of actions that will unfold the given image into the desired shape. Teaches the concept of symmetry and the idea of a function or transformation.

Module 2: Super Challenge

Game Name	Game Description
Venn Space	Place the object in the correct section of the Venn diagram according to its attributes.
Venn Space Pick Shape	Identify the object that has the attributes corresponding to a particular section of a Venn diagram.
Ice Caves	Identify lines of symmetry in two-dimensional shapes.
Dot Shapes	Connect dots to form shapes which will fill holes in the ground.
Upright JiJi	Find a sequence of rotations to move JiJi into an upright position.
Kick Box	Use lasers and mirrors to move the spheres out of the way so JiJi can pass.

Patterns in Number and Shape

Module 1: Shape and Situational Patterns

Game Name	Game Description
Pattern Wheel	Identify and extend patterns of different geometric shapes.
Pattern Directions	Extend repeating patterns in various directions. Here the objects all have the same shape; the patterns are based on color, orientation, and rotation.
Robot Patterns	Identify and extend geometric patterns of colored squares on a grid.
Helicopter	Identify the number of stacks the helicopter should drop in order to fill the hole in the ground. Teaches proportional relationships.
Helicopter Table	Fill in the empty boxes in the table with the correct number of blocks for the given the number of helicopters or with the number of helicopters given the number of blocks.
Make it Linear	Determine the number of blocks needed to make the sequence linear.

Module 2: Implicit Pattern Features

Game Name	Game Description
Hundreds Pit	Count by 2s, 5s, or 10s to fill the pit so JiJi can cross. Identify patterns in the counting sequence.
Multiplication Table Parts	Find locations in the multiplication table that correspond to multiplication facts with a given product. Investigate relationships between nearby rows and columns with puzzles that have multiple products.
Multiplication Pattern Strings	Multiply whole numbers using a place value model.

Common Core Standards Coverage:

Direct:

4.OA.4 **Find all factor pairs for a whole number in the range 1 to 100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1 to 100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1 to 100 is prime or composite.**

4.OA.5 **Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.**

Mixed Numbers

Module 1: Mixed Numbers with Visual Models

Game Name	Game Description
Match Fraction	Represent a given fraction using a visual model by first dividing a whole into equal parts and then shading the correct number of parts.
Crank Pies	Represent given fractions, improper fractions, and mixed numbers as circular diagrams displaying equal parts of a whole. This game also teaches the idea of equivalent fractions.
Alien Bridge	Use pies divided into fourths to create a fraction diagram to match the given one.
Match Fraction LI	Represent a given fraction using a visual model by first dividing a whole into equal parts and then shading the correct number of parts.

Module 2: Mixed Numbers on the Number Line

Game Name	Game Description
JiJi Cycle Select Wheel	Relate a collection of fractions represented with circular diagrams to a single point on the number line.
Scale Fraction	Plot the combined length of a collection of rectangles on the number line.
Estimate Fractions on the Number Line	Estimate the location fractions on the number line.
Fraction Trap	Estimate on a number line the location of Fractions
Numerator Denominator	Identify the numerator and denominator of a fraction represented as a diagram, symbol, or word using the terms numerator and denominator.

Common Core Standards Coverage:

Direct:

4.NF.3 Understand a fraction *a/b* with *a*>1 as a sum of fractions 1/*b*.

Supporting:

4.NF.1 Explain why a fraction a/b is equivalent to a fraction (n x a)/(n x b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.

4.NF.3c Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.

Fractions - Equivalence and Ordering

Module 1: Fraction Equivalence

Game Name	Game Description
Fricks	Represent the same length using different partitionings.
Common Denominator with Wholes	Use the model to implicitly find the common denominator.
Common Denominator with Fractions	Find the common denominator of unit fractions.
Equivalent Fractions	Identify equivalent fractions using rectangular diagrams displaying equal parts of a whole.
Equivalent Fractions LI	Identify equivalent fractions using rectangular diagrams displaying equal parts of a whole.

Module 2: Fraction Ordering

Game Name	Game Description
Fraction Trap	Estimate on a number line the location of fractions.
Fraction More or Less	Compare fractions with the same numerator or the same denominator using models.
Mixed More or Less	Compare mixed numbers with the same numerator or the same denominator using models.
Fraction Order Fill	Help JiJi cross the pit by putting one- and two-place decimals in order from least to greatest.

Common Core Standards Coverage:

Direct:

4.NF.1 **Explain why a fraction a/b is equivalent to a fraction (n x a)/(n x b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.**

4.NF.2 **Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols for less than, greater than, or equal to and justify the conclusions, e.g., by using a visual fraction model**

Supporting:

4.NF.7 Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols for greater than, less than, or equal to and justify the conclusions, e.g., by using a visual model.

Challenge

Module 1: Challenge

Game Name	Game Description
Bird Brain	Find birds in a grid after a sequence of transformations.
Venn Space	Place the object in the correct section of the Venn diagram according to its attributes.
Big Seed	Fill all the holes using colored tiles. A group of tiles of the same color can be unfolded along 8 symmetry axes. The color of tiles can also be changed.
Venn Space Pick Shape	Identify the object that has the attributes corresponding to a particular section of a Venn diagram.

Module 2: Super Challenge

Game Name	Game Description
Dot Shapes	Connect dots to form shapes which will fill holes in the ground.
Concentration Nums	Practice multiplication facts.
Ice Caves	Identify lines of symmetry in two-dimensional shapes.
Kick Box	Use lasers and mirrors to move the spheres out of the way so JiJi can pass.

Volume

Game Name	Game Description
Intro to Volume	Calculate the volume of a right rectangular prism and express it using metric or U.S. customary cubic units.
Helicopter Volume	Identify the number of stacks the helicopter should drop in order to fill the hole in the ground.
Helicopter Volume LI	Identify the number of stacks the helicopter should drop in order to fill the hole in the ground.
Volume Fill	Calculate the volume of a right rectangular prism and express it using metric or U.S. customary cubic units.
Area, Perimeter, Volume Select	Calculate the volumes of rectangular and triangular prisms and express them using metric or U.S. customary cubic units.

Common Core Standards Coverage:

Direct:

5.MD.3 **Recognize volume as an attribute of solid figures and understand concepts of volume measurement.**

5.MD.3a **A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume.**

5.MD.3b **A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.**

5.MD.4 **Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.**

5.MD.5 **Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.**

5.MD.5a **Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.**

5.MD.5b **Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole number edge lengths in the context of solving real world and mathematical problems.**

5.MD.5c **Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.**

Supporting:

5.OA.3 Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. For example, given the rule “Add 3” and the starting number 0, and given the rule “Add 6” and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.

Using Parentheses

Game Name	Game Description
Operation Race	Evaluate numerical expressions using the correct order of operations.
Complete Box	Write an expression to describe the area. Includes adding or deducting from the area and nonstandard shapes.
Operation Race with Parentheses	Identify the operator precedence for numerical expressions involving arithmetic operations and parentheses.
Multiplying with Parentheses	Learn the meaning of and how to simplify expressions involving variables and parentheses.
Which Parentheses?	Identify where the parentheses should be placed to make the expression equal to the given value.

Common Core Standards Coverage:

Direct:

5.OA.1 Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.

Supporting:

5.OA.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. For example, express the calculation “add 8 and 7, then multiply by 2” as 2 x (8 + 7). Recognize that 3 x (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.

Fractions on the Number Line

Game Name	Game Description
JiJi Cycle Basket	Estimate the location of a fraction represented with a diagram on the number line.
Scale Fraction	Plot the combined length of a collection of rectangles on the number line.
JiJi Cycle	Select the fraction corresponding to the marked point on the number line. The fractions are represented visually as equal parts of a circle.
JiJi Cycle Select Wheel LI	Relate a collection of fractions to a single point on the number line.
Estimate Fractions on a Number Line	Estimate the location of fractions on the number line.
Fraction Trap	Estimate on a number line the location of fractions.
Bubble Fraction Trap	Write the fraction shown on the number line.

Common Core Standards Coverage:

Supporting:

5.NF.1 Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)

5.NF.2 Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 is less than 1/2.

Challenge

Game Name	Game Description
Concentration Nums	Practice multiplication facts.
Big Seed	Find a sequence of actions that will unfold the given image into the desired shape. Teaches the concept of symmetry and the idea of a function or transformation.
Bird Brain	Find birds in a grid after a sequence of transformations.
Dot Shapes	Connect dots to form shapes which will fill holes in the ground.
Ice Caves	Identify lines of symmetry in two-dimensional shapes.
Upright JiJi	Find a sequence of rotations to move JiJi into an upright position.
Kick Box	Use lasers and mirrors to move the spheres out of the way so JiJi can pass.

Using Parentheses

Game Name	Game Description
Complete Box	Fill in the blanks to create an expression that represents the area and arrangement of blocks that is shown.
Which Parentheses?	Identify where the parentheses should be placed to make the expression equal to the given value.
Box Commute	Use the commutative property to transform the given expression into one that represents a different configuration of blocks.
Wall Factory	Choose values for the variables to make the given expression represent the configuration of blocks in the ground.
Wall Factory Multiple Choice	Choose the expression that could represent the given configuration of blocks.

Common Core Standards Coverage:

Direct:

6.EE.2 **Write, read, and evaluate expressions in which letters stand for numbers.**

6.EE.2c **Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (’Order of Operations’)."**

6.EE.3 **Apply the properties of operations to generate equivalent expressions.**

Supporting

6.EE.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).

Linear Relationships

Game Name	Game Description
Helicopter	Identify the number of stacks the helicopter should drop in order to fill the hole in the ground, when shown the total number of blocks and the rate of blocks per helicopter.
Make it Linear Table	Given a description of a proportional relationship, fill in missing values in a table of pairs corresponding to the ratio described.
Helicopter Table	Fill in the empty boxes in the table with the correct number of blocks for the given the number of helicopters or with the number of helicopters given the number of blocks.
Linear Transform	Given an operation or a sequence of two operations, find the output resulting from a given input, or the input required to produce a given output.
Linear Transform Function	Select the linear function, represented as an operation or sequence of two operations, that is consistent with the given input and output values.
Linear Transform Table	Fill in the table with the missing inputs or outputs for a given linear function, or, in other levels, identify the function that corresponds to the given table of inputs and outputs.

Common Core Standards Coverage:

Direct:

6.RP.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.3a **Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.**

6.EE.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.**

Supporting:

6.EE.9 Use variables to represent two quantities in a real world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

Exponents

Module 1: Exponentiation

Game Name	Game Description
Build Shape	Build the given shape using visual exponentiation.
Circle Exponents	Build the given shape using repeated multiplication.
Exponential Notation	Build the given shape using exponential notation.
Repeated Expressions	Given an exponential or multiplicative expression, select repeated addition or repeated multiplication.
Write Exponential Expressions	Given a repeated multiplication or addition expression, write the expression in exponential or multiplicative notation.
Number Line Exponents	Plot an exponential expression on the number line.
Number Line Exponents Bubble Select	Evaluate an exponential expression.

Module 2: Exponentiation and the Other Operations

Game Name	Game Description
Operation Race with Exponents	Decompose an expression without parentheses by using the order of operations.
Number Line Exponents Two Operations	Given an expression with two operations, evaluate it using the number line.
Number Line Exponents Two Ops Bubble Select	Numerically evaluate an expression that has two operations.
Operation Race with Parentheses	Decompose an expression using the full order of operations (parentheses included).

Common Core Standards Coverage:

Direct:

6.EE.1 Write and evaluate numerical expressions involving whole number exponents.

Supporting:

6.EE.2b Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity.

Challenge

Game Name	Game Description
Upright JiJi	Find a sequence of rotations to move JiJi into an upright position.
Concentration Nums	Practice multiplication facts.
Big Seed	Find a sequence of actions that will unfold the given image into the desired shape. Teaches the concept of symmetry and the idea of a function or transformation.
Bird Brain	Find birds in a grid after a sequence of transformations.
Dot Shapes	Connect dots to form shapes which will fill holes in the ground.
Ice Caves	Identify lines of symmetry in two-dimensional shapes.
Kick Box	Use lasers and mirrors to move the spheres out of the way so JiJi can pass.