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Capstone Project

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**A Play Plan Guidebook of Play-based Math Centers**

**Based on the Great Minds Eureka Kindergarten Math Curriculum**



This Capstone project is a collection of guided-play learning experiences that align with the kindergarten math standards and the Eureka Math Curriculum for kindergarten. These are activities that allow the students to practice the skills they are learning while engaging in physical, cognitive, social, and emotional development. I have included the Common Core Standards for kindergarten math. The main body of this document is organized to reflect the Modules of the Eureka Math Curriculum that the play learning experiences are based on.

These activities, done in small groups, can be carried out using materials that are easily accessed online or that I already had in my classroom that the children were naturally drawn to – the dramatic play area, blocks, playdough, games, cars, and manipulatives. Although they were put together based on the kindergarten curriculum, all the activities can be adjusted to be appropriate for other ages. I use some of them in the preschool classroom I am currently working in.

This past year has made us all appreciate the value of face-to-face contact. No one needs that more than children. Play is a vital and important way for children to learn about the world and how to successfully navigate it. Through play, children learn to use their imagination and increase creativity. They develop better language skills. Through play, children learn social interaction skills and learn to regulate their emotions. Play helps children build confidence in themselves and their ability to form relationships with others. It can also help reinforce the academic lessons they are learning.

My research question, “Can play be incorporated into the kindergarten schedule without interrupting the rigor of instructional curriculum?” is without a doubt answered. It can and it should. Using play experiences in the classroom can help children learn the relevance of the skills they are practicing. It can also help a teacher, who struggles to like math, learn to find the joy in teaching it!

This is dedicated to the teachers that helped shape me as a student, and the students who helped shape me as a teacher. I find joy in your joy of learning.

“We don’t stop playing because we grow old. We grow old because we stop playing.” – George Bernard Shaw

Kindergarten Math Common Core Standards – Corestandards.org/math/content/k/introduction/

In Kindergarten, instructional time should focus on two critical areas: (1) representing and comparing whole numbers, initially with sets of objects; (2) describing shapes and space. More learning time in Kindergarten should be devoted to number than to other topics.

1. Students use numbers, including written numerals, to represent quantities and to solve quantitative problems, such as counting objects in a set; counting out a given number of objects; comparing sets or numerals; and modeling simple joining and separating situations with sets of objects, or eventually with equations such as 5 + 2 = 7 and 7 – 2 = 5. (Kindergarten students should see addition and subtraction equations, and student writing of equations in kindergarten is encouraged, but it is not required.) Students choose, combine, and apply effective strategies for answering quantitative questions, including quickly recognizing the cardinalities of small sets of objects, counting and producing sets of given sizes, counting the number of objects in combined sets, or counting the number of objects that remain in a set after some are taken away.
2. Students describe their physical world using geometric ideas (e.g., shape, orientation, spatial relations) and vocabulary. They identify, name, and describe basic two-dimensional shapes, such as squares, triangles, circles, rectangles, and hexagons, presented in a variety of ways (e.g., with different sizes and orientations), as well as three-dimensional shapes such as cubes, cones, cylinders, and spheres. They use basic shapes and spatial reasoning to model objects in their environment and to construct more complex shapes.

Grade K Overview

Counting and Cardinality

* Know number names and the count sequence.
* Count to tell the number of objects.
* Compare numbers.

Operations and Algebraic Thinking

* Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.

Number and Operations in Base Ten

* Work with numbers 11-19 to gain foundations for place value.

Measurement and Data

* Describe and compare measurable attributes.
* Classify objects and count the number of objects in each category

Geometry

* Identify and describe shapes.
* Analyze, compare, create, and compose shapes.

Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

**Module 1 – Numbers to 10**

1. **Attributes of two related objects**

Play experiences:

Memory Game with pictures/visual patterns

Potato Head Matching-assemble potato heads with matching pieces

Dramatic Play

Set the table using dishes/utensils that are the same or not exactly the same

Describe foods/objects that are the same/different

Match pairs of patterned socks on clothesline

Candy Land Game

1. **Classify to Make Categories and Count**

Dramatic Play

Sort items in kitchen (food, utensils, etc.)

Sort students – allow students to decide how to be sorted (by hair, eyes, clothing, etc.)

Sorting stations around the room: shapes, art materials, transportation, kitchen items, mini erasers, Legos, magnets, bears, pom poms, etc.

Sort subitizing pictures (numbers 2, 3, and 4)

1. **Numbers to 5 in Different Configurations, Math Drawings, and Expressions**

Put numbered Legos together in order

Dramatic Play

Pretend store – Use play money to “buy” items labeled 1-5

Number Memory – Use Uno/playing cards

Match Dominos

Draw 2 number cards (Uno or playing cards) compare numbers using cubes, bears, dominoes, etc. (use balance scale to determine more/less)

Playdough number mats

Subitizing puzzles

Sort dominos by number of dots

1. **The Concept of Zero and working with numbers 1-5**
2. **Working with Numbers with numbers 6-8 in Different Configurations**
3. **Working with Numbers 9-10 in Different Configurations**

Flip and Compare – Flip two cards, build tower with cubes or Legos, determine more than/less than

Make numbers with playdough

Stamp in playdough with Legos

Patterning with Legos

Build towers on Uno cards

Toss beanbag onto paper number, do that many gross motor activities (i.e. jump, hop, clap, etc.)

Dramatic Play – Set up a restaurant; make menu with dollar amount of $1 - $5.

Set up a Post Office; sort mail by number

Park play cars on numbered parking spaces (draw parking spaces on paper)

Grab and count – pick up handful of Legos, count, compare with partner

I Have/Who Has Number games

Play Hopscotch

Roll and Count – www.thestemlaboratory.com

1. ***One More* with Numbers 0-10**
2. ***One Less* with Numbers 0-10**

Dramatic Play area – encourage students to make change for “purchases”

Roll Dice, show one more or one less with mini erasers

Put dominos in order of how many dots

One more/One Less mat – Roll dice, use bears, cubes, erasers, etc. to show how many. Tell partner one more is, one less is.

Find the Difference Face Off game - [www.frugalfun4boys.com](http://www.frugalfun4boys.com)

Ladybug One More & One Less - [www.fantasticfunandlearning.com](http://www.fantasticfunandlearning.com)



**Module 2 – Two Dimensional and Three-Dimensional Shapes**

1. **Two-Dimensional Flat Shapes**

Sort shapes using pattern blocks

Students sort shapes on Venn diagram made with hula hoops

Shape bingo

Play Qwirkle game

Make shapes with playdough and shape cards <https://homeschoolcreations.com>

Students work together to make shapes with bodies

Shapes game – [www.fantasticfunandlearning.com](http://www.fantasticfunandlearning.com)

Roll a Shape game – [www.themeasuredmom.com](http://www.themeasuredmom.com)

The Shape Game – [www.themeasuredmom.com](http://www.themeasuredmom.com)

Shape Bingo – [www.PreschoolMom.com](http://www.PreschoolMom.com)

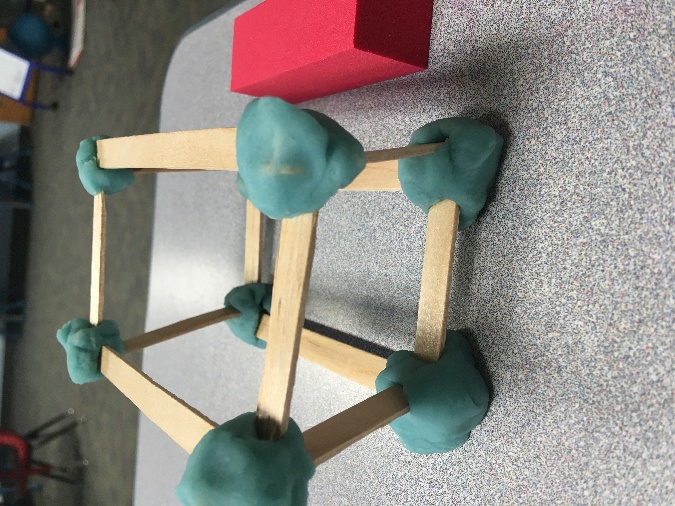
1. **Three-Dimensional Solid Shapes**

Use Magnatiles to build shapes

3-D Shapes Memory Game

Construct Shapes using playdough and popsicle sticks

3-D Shape Matching Puzzles – [www.fantasticfunandlearning.com](http://www.fantasticfunandlearning.com)



**Module 3 – Comparison of Length and Height**

1. **Comparison of length and height**
2. **Comparison of length and height of linking cube sticks within 10**

Use manipulatives to measure/compare length and height

Cubes

Links

Blocks

Tape measure

Cut string and compare lengths

Make strings of playdough and compare, measure with ruler

Draw numbers or playing cards, build towers with cubes or pegs, compare heights

Stack blocks, compare heights

Build towers with Magna-tiles

Roll dice, add cubes to towers

Students measure each other with wooden blocks or other objects (i.e. shoes, hands, cars, etc.)

Back to School Measurement - [www.Unitedteaching.com](http://www.Unitedteaching.com)

Play “1,2,3, break” – Two students build towers of 10 cubes. Each puts the tower behind their back. Count to 3 and break the tower. Students then compare their towers (longer/shorter.)

Measure food in the Dramatic Play area using linking cubes

Use linking cubes to measure names

Use objects (tape measure, linking cubes, blocks, etc.) to measure furniture in the Dramatic Play area

1. **Comparison of weight**

Weigh kitchen play food with balance scale

Weigh playdough with balance scale

Game: Don’t Spill the Beans

Weigh classroom objects with balance scale (blocks, stuffed animals, manipulatives, art supplies, etc.)

Draw number card, compare weight of two items of that amount (i.e. two bears vs. two Legos)

Weight challenge – Put piece of playdough on one side of the balance scale. Challenge partner to match weight with objects – [www.thestemlaboratory.com](http://www.thestemlaboratory.com)

1. **Comparison of Volume**

Have different sized containers in the water table.

Have students guess how many objects are in a container

Put rice, beans, or sand in the sensory table with measuring cups

Have students guess how many cups it would take to fill a container using different sized measuring cups or drinking cups

Use measuring cups in the Dramatic Play area to make “recipes” using beans or flour

1. **Are there enough?**

Fill in shapes on paper (or floor) with objects (i.e., bears, cubes, blocks, cars, food, etc.)

Fill in large shape on the floor with students or shoes

Fill in plates with cubes, bears, etc. in the Dramatic Play area

Using play cars, compare number of cars to number of parking spaces

Play Musical Chairs

In Dramatic Play, compare number of plates, utensils, etc. to amount of food to see if there is enough for each plate.

Play Hi-Ho Cherry-O

Play “1,2,3, Break” and compare more, less, the same

Draw a number card and build with blocks or Legos using that amount

Make sets with shapes

1. **Comparison of sets within 10**

Compare sets of different objects (bears, blocks, food from play kitchen, etc.) to determine which set has more/less.

As partners, one student draws a set of shapes. The partner draws a set that has 1 more or 1 less.

Play “1, 2, 3, Break.” Partners identify which has more, less, fewer, same.

1. **Comparison of numerals**

Two students flip Uno/playing cards, determine which number is more/less.

Play the game, “Chutes and Ladders”

Play the game, “Hi Ho Cherry-O”

Draw a number card and use a balance scale to weigh and compare different amounts of objects

Two students take a handful of objects (i.e., bears) and compare amounts using more/less than, same

Build train tracks and compare number of track pieces, train cars

1. **Clarification of Measurable Attributes**

Use eyedroppers to drop colored water into shapes

Have measuring cups, containers of different sizes in water/sand table

Use measuring cups/spoons with playdough

Make different sculptures from playdough of the same weight

Build with wood blocks from pictures of local landmarks, measure with cubes

Measure volume of 3-d shapes

Measure food containers in Dramatic play area (i.e., cereal boxes)

Use common household containers in the water/sand table (i.e., milk, orange juice, or butter container)

Use a balance scale in the water table with plastic eggs

Use measuring cups in the water table with rocks

**Module 4 – Number pairs, addition, and subtraction to 10**

1. **Compositions and decompositions of 2, 3, 4, and 5**

Draw number card, use Legos to represent numbers, add or subtract

Playdough subtraction – [www.thekindergartensmorgasboard.com](http://www.thekindergartensmorgasboard.com)

String beads on pipe cleaners to represent addition

Roll dice, build with cubes or Legos to represent addition

Roll dice, build number with different colored playdough

Play “1, 2, 3, break”

Use hula hoops to represent number bonds, use stuffed animals to represent numbers

Use playdough in number bonds

Add dots on dominos to fill in number bonds with playdough

Use plates from Dramatic play to represent number bonds, fill with food

Play the “Lego Game” – [www.Playdoughtoplato.com](http://www.Playdoughtoplato.com)

Addition & Subtraction Fluency within 5 game - [www.123homeschoolforme.com](http://www.123homeschoolforme.com)

1. **Decomposition of 6, 7, and 8 into number pairs**

Use construction paper parking lots to represent number bonds, park cars

Build with blocks, Legos, bears, etc. in number bonds

Use plates from Dramatic play to represent number bonds

Stamp playdough with Legos

Stamp playdough with dinosaur feet

Use cubes to represent dots on dominos

Put playdough balls in number bonds

1. **Addition with totals to 6, 7, and 8**

Use hula hoops and food to represent number bonds

Use Legos, math cubes, bears, playdough in number bonds

Play Chutes and Ladders game

Roll and Add game – <https://rainydaymum.co.uk>

Play Memory

1. **Subtraction from numbers to 8**

Play Hi-Ho Cherry-O game

Bowling

Subtraction Smash with playdough – [www.recipeforteaching.com](http://www.recipeforteaching.com)

Parking lot number bonds/cars – make numbered parking lots for number bonds

Tally food in the Dramatic play area

Lego tower subtraction Race with dice – instead of building a Lego tower roll by roll, start with 10 and take Legos off

Pretend play store inventory

1. **Decomposition of 9 and 10 into number pairs**

Bowling (label pins with numbers)

Parking lot number bonds/cars

Serve beans (add and subtract) in Dramatic play

Play “1, 2, 3, break”

Make arrays with cars, parking lot

1. **Addition with totals of 9 or 10**

Roll dice, add Legos, pegs, blocks, etc. to 9 or 10

Flip Uno/playing cards, add to 9 or 10

Dramatic Play - Pretend play shopping

Use hula hoops to make number bonds, use students to represent numbers

What can you build using 9 or 10 Legos

Roll and Add game - <https://rainydaymum.co.uk>

1. **Subtraction from 9 and 10**

Bowling

Roll dice, subtract play cars from parking lot

Play “1, 2, 3, break”

Dramatic Play - Use play money to “shop,” make change

Play Hi Ho Cherry-O

Flip Uno/playing card. Subtract from 9 or 10

Subtraction Facts Game cards - <https://rainydaymum.co.uk>

1. **Patterning with adding 0 and 1 making 10**

Roll dice, race to 10 on number path

Draw card, name number that is one more

Draw card or roll dice, put objects on 10-frame or number path, compare

Trace hands, roll dice to get to 10

Hi Ho Cherry-O



**Module 5 – Numbers 10-20 and Counting to 100**

1. **Count 10 ones and some ones**

Play teen number Bingo – [www.mrsbsbeehive.com](http://www.mrsbsbeehive.com)

Draw teen number card, build with that many Legos/blocks

Assemble picture puzzles labeled with teen numbers

Draw 2 teen numbers, weigh that many beans, bears, etc. on balance scale



1. **Compose numbers 11-20 from 10 ones and some ones; Represent and write teen numbers**

Roll and Race game – [www.thisreadingmama.com](http://www.thisreadingmama.com)

Dramatic Play - Play store – label $10 on some food, ones on others

Play Chutes and Ladders

Flip Uno cards, add to 10

Assemble Legos marked with numbers and/or dots

Flip number card, build with cubes

Draw number card, set up Dominos

Number bond parking lots

Go Fish - [www.teacherspayteachers.com/store/creative-math-nerd](http://www.teacherspayteachers.com/store/creative-math-nerd)

Bubble Bonds - [www.Thestemlaboratory.com](http://www.Thestemlaboratory.com)



1. **Decompose numbers 11-20 and count to answer “How many?” questions in varied configurations**

Assemble numbered picture puzzles

Spin & Cover game - [www.teacherspayteachers.com/store/Elaine-Maggard](http://www.teacherspayteachers.com/store/Elaine-Maggard)

Flip card, add to 10, build with Legos, cubes, blocks

Go Fish card game

Build with numbered Legos

Memory game with numbers, 10-frames

Dramatic Play - Label plates and food to sort in Dramatic play area

1. **Extend the say ten and regular count sequence to 100**

Play Chutes and Ladders

Roll die and Cover 100 chart with pennies

Counting by 10’s with numbered cars, Legos, blocks, etc.

Hopscotch by 10’s

Playdough, make 100 balls

1. **Represent and apply compositions and decompositions of teen numbers**

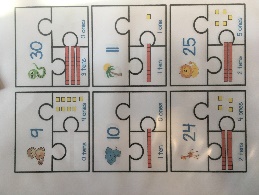
Teen number puzzles – [www.teacherspayteachers.com](http://www.teacherspayteachers.com)

Spin and Cover game – [www.teacherspayteachers.com/store/Elaine-Maggard](http://www.teacherspayteachers.com/store/Elaine-Maggard)

Draw a teen number card, count, build with that many Legos

Dramatic Play - Sort food in dramatic play by labeled teen numbers

Roll and Race to 20 on number lines



**Module 6 - Analyzing, Comparing, and Composing Shapes**

1. **Building and drawing flat and solid shapes**

Make shape pictures with paper shapes or colored toothpicks

Build shapes with Magna-tiles

Build shapes using playdough and toothpicks or popsicle sticks

Make shapes with playdough on shape mats

Build with wooden blocks

1. **Composing and decomposing shapes**

Create pictures using pattern blocks

Combine pattern blocks to create new shapes using pattern cards

Press pattern blocks into playdough to make shapes

Construct shapes using pattern blocks

Roll and Cover Game

Pattern Block Logic Puzzles



**Resources**

Lego Addition to 5 – [www.PlaydoughtoPlato.com](http://www.PlaydoughtoPlato.com)

Counting to 6 – [www.Thestemlaboratory.com](http://www.Thestemlaboratory.com)

Back to School Measurement – [www.Unitedteaching.com](http://www.Unitedteaching.com)

Bubble Bond Numbers – [www.Thestemlaboratory.com](http://www.Thestemlaboratory.com)

Playdough Mats (Numbers 0-10) –www.Homeschoolcreations.com

Ladybug One More & One Less – [www.fantasticfunandlearning.com](http://www.fantasticfunandlearning.com)

Shape puzzle cards –www.fantasticfunandlearning.com

Spin and Cover 3D Shapes – [www.lifeovercs.com](http://www.lifeovercs.com)

Shapes Game – [www.fantasticfunandlearning.com](http://www.fantasticfunandlearning.com)

Marshmallow Shapes – [www.lifeovercs.com](http://www.lifeovercs.com)

The Shape Game – [www.themeasuredmom.com](http://www.themeasuredmom.com)

Roll a Shape – [www.themeasuredmom.com](http://www.themeasuredmom.com)

Shape Bingo – [www.PreschoolMom.com](http://www.PreschoolMom.com)

Weight challenges – [www.thestemlaboratory.com](http://www.thestemlaboratory.com)

Addition and Subtraction fluency within 5 – [www.123homeschoolforme.com](http://www.123homeschoolforme.com)

Playdough subtraction – [www.thekindergartensmorgasbord.com](http://www.thekindergartensmorgasbord.com)

2D Shapes Playdough Mats – [www.Misskindergarten.com](http://www.Misskindergarten.com)

Find the Difference Face Off! – [www.frugalfun4boys.com](http://www.frugalfun4boys.com)

Subtraction Smash – [www.recipeforteaching.com](http://www.recipeforteaching.com)

Counting Apples – <https://rainydaymum.co.uk>

Teen Number Go Fish – [www.teacherspayteachers.com/store/creative-math-nerd](http://www.teacherspayteachers.com/store/creative-math-nerd)

Subtraction Facts Game Cards – <https://rainydaymum.co.uk>

Roll and Add – <https://rainydaymum.co.uk>

Roll & Race Addition & Subtraction Games – [www.thisreadingmama.com](http://www.thisreadingmama.com)

Build and Write – [www.akteacherlife.com](http://www.akteacherlife.com)

Teen Number Spin & Cover Board Game – [www.teacherspayteachers.com/store/Elaine-Maggard](http://www.teacherspayteachers.com/store/Elaine-Maggard)

Decomposing Teen Numbers puzzle –https/www.teacherspayteachers.com/Product/FREE-Decomposing-Teen-Numbers-Place-Value-Puzzles-for-Math-Centers-3295098?st=c5279703efc5c28485bbbeeec39509ad