

Discrete Math Unit Kindergarten

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Executive Summary

This kindergarten discrete math unit includes activities to meet Minnesota Standards:

K.2.1.1	Identify, create, complete, and extend simple patterns using shape, color, size, number, sounds, and movements. Patterns may be repeating growing or shrinking such as AB, ABB, ABC, or *.**.***.
K.3.1.1	Recognize basic two and three dimensional shapes such as squares, triangles, circles, rectangles, trapezoids, hexagons, cubes, cones, cylinders, and spheres.
K.3.1.2	Sort objects using characteristics such as shape, size, color and thickness.
K.3.1.3	Use basic shapes and spatial reasoning to model objects in the real-world.
K.3.2.1	Use words to compare objects according to length, size, weight and position.

Students will create and identify patterns as well as explore a variety of ways a pattern can be made with a set amount of materials. Students will describe, identify, order and create shapes. Students will use 2-d shapes to create a new unique geometric shape. Students will build foundations for later math use with geometric vocabulary including vertex and edge. Students will sort, and describe shapes based on different attributes. Students will count organize and list the shapes they have used to create a new design. Students will also explore the variety of possible arrangements patterns can be made when given a set number of shapes.

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Day	Activity	Math Skill
1	Pre-test, Shape sort, read Skippyjon Jones Shape Up	Shape explore, shape sort
2	Identify 2 shapes square circle using shape roads	Identification, exploration
3	Identify 2 new shapes triangle rectangle, exploring shapes with manipulatives, Shape Bingo	Identification, exploration
4	Identify 2 new shapes trapezoid hexagon, block pattern cards	Identification, sorting, patterns
5	Read Mouse Shapes, creating with shapes, Shape hunt in real world	Identification, creating, real world applications
6	Shape hunt with ipads around school	Sorting Id, attributes, real world application
7	3D shapes, song, favorite shape graph	Identification, graphing
8	Create shapes with geoboards	Creating shapes
9	Create shapes with partners playing Simon says and white boards	Creating shapes
10	Make My Shape Pizza "Little Red Hen Makes A Pizza" https://www.youtube.com/watch?v=91IJsEdUkyg	Creating shapes
11	Marshmallows and toothpicks creation	Creating shapes
12	Move into talking about vertex which was the marshmallow yesterday and the edges represented by the toothpicks	Geometry terms foundation
13	Fill a hexagon with shapes activity	Different ways to fill a hexagon
14	Build a shape robot	identification/creation of shapes
15	Fill a shape, trapezoid activity.	Different ways to fill a

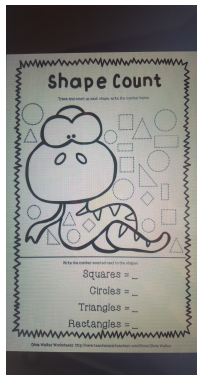
		trapezoid.
16	Identify AB pattern	Patterns
17	Identify ABC pattern	pattern
18	Identify ABB pattern	pattern
19	Identify AABB pattern	pattern
20	Create own pattern on fruit loop necklace	Variety ways to create patterns
21	How many patterns using 3 shapes can I make	Arrangements of patterns
22	How many patterns using 4 shapes can I make	Arrangements of patterns

Shapes-Joni Tobeck

Day 1

Lesson Objective: Students will be able to sort shapes by different attributes.

Pretest-



Launch- Today I am going to read the book *Skippyjon Jones Shape Up* by Judy Schachner. Let's find out what our favorite cat who thinks he is a dog will tell us about shapes.

Mini Lesson (direct instruction of skill): Tell the students that you had all the shapes lined up nicely, but they got pushed off the table and are all mixed up. Ask the students if they will help you organize them. Show them the shape sorting mats. Pick a shape out of the box. Hold it up, trace your finger around the shape. Talk about if it has corners and straight lines or goes around. Ask the students what color it is, and if they know what shape it is. Show them where the shape would go. Do a few more examples and then have a few students come up and figure out where to place their shape.

Students Explore in Groups: Give students shape blocks to explore, play with, and sort in pairs.

Share/Summarize: Meet back at rug to talk about shapes. What did you notice about the shapes, are there shapes that have corners or no corners. Have you seen some of these shapes before? Where do we find shapes at home? Outside? At the store?

Pretest/Post test <https://www.teacherspayteachers.com/Product/Shape-Worksheets-Geometry-Worksheets-Kindergarten-Grade-One-FREE-1927158>

Day 2

Lesson Objective: Students will be able to identify a square and circle

Launch- Today we are going to learn a new finger play to help us learn our shapes. I will do it first and then we will do it together.

Circle Rhyme

Circle, a circle,

Draw it round and fat. *(Use finger to draw circle in the air.)*

A circle, a circle,

Draw it for a hat. *(Draw a circle in the air over the head.)*

A circle, a circle, Draw it just for me. *(Draw a circle in the air.)*

A circle, a circle,

Now jump and count to three: One! Two! Three!

Mini Lesson (direct instruction of skill): Show students the shape roads, ask them what they think you could do with them, ask students what happens when you get to the end of the road? You have to turn. Tell the students that you are going to practice driving on the shape roads. Show students how you need to slow down to make sure you keep your car on the road. When you come to the end of the road you need to turn the corner. Hold up a shape road and trace around it with your finger, talk about the points. Count the corners and the sides.

Students Explore in Groups: Give the students the shape roads and miniature cars to explore. Count the sides and corners of each shape. Draw the shape on white board with marker. Work with a partner. Write how many sides each shape has on the whiteboard.



Learning Shapes
With Toy Cars

<http://adventuresofadam.co.uk/wp-content/uploads/2016/03/Learning-Shapes-With-Toy-Cars.jpg>

Share/Summarize (reflection back on rug to confer): Meet back at the rug with your partner. Have a pair of students hold up a shape, talk about how many sides it has, does it have corners? Show us how you can drive your car on the road. What was your favorite shape road to drive on and why?

Day 3

Lesson Objective: Students will be able to identify triangles and rectangles.

Launch- Today we are going to watch a video about shapes. We will watch it, and then watch it again and we can sing along. <https://www.youtube.com/watch?v=pfRuLS-Vnjs>

Mini Lesson (direct instruction of skill): Hold up an equilateral triangle. Ask students what they see, how many sides, how many corners? Hold up an isosceles triangle, ask what they see and how many sides and corners it has. Hold up a right triangle and ask about sides and corners. Tell the students that even though they do not always look the same triangles always have 3 sides and 3 corners. Hold up a rectangle so it looks like a door, talk about corners and sides. Turn it so it looks like a table. Talk about corners and sides. Tell them that they are the same shape even if you turn it.

Students Explore in Groups: After students have had a chance to explore triangles and rectangles. Give each student a white board and marker. Let them trace the different triangles on their boards. Talk with a partner about the number of sides and corners. Do the same with rectangles. Ask the students to draw a picture using triangles and/ or rectangles.

Share/Summarize (reflection back on rug to confer): Meet back at the rug. Hold up different triangles and rectangles, Ask if it is still a triangle/rectangle when I turn it this way? How about when I turn it this way. How many sides do triangles have? How many sides do rectangles have? Who remembers what other shape has 4 sides? Rectangles can be look like doors or tables. Remember this when we play Shape Bingo. We are going to take turns pulling a shape out of the bag, try to name the shape. The rest of you can look for it on your Bingo card. You can help your neighbor if they are stuck.

Day 4

Lesson Objective: Students will be able to identify a hexagon and trapezoid

Launch- Yesterday we watched a video about different shapes. We are going to watch another song and video about shapes.

<https://www.youtube.com/watch?v=beTDz9HSNOM>

Mini Lesson (direct instruction of skill): I have a bunch of picture cards and all of these shapes. We are going to cover the picture with the different shapes.

Students Explore in Groups: Allow students time to complete different shape cards using the different wooden block shapes.

Share/Summarize (reflection back on rug to confer): Have students come back to the circle and talk about the different shapes they used to complete the shape pattern cards. Ask a student to complete a card using the magnet wooden blocks on the whiteboard. Ask which cards they thought were hard/easy/their favorite and why.

Day 5

Lesson Objective :Students will be able to identify real world shapes around the school.

Launch-Today I am going to read the book *Mouse Shapes* by Ellen Stoll Walsh. It is by the same author as *Mouse Paint*. What do you think this book will be about? Let's read and find out.

Mini Lesson (direct instruction of skill): The mice in this story are trying to hide from the cat. Along the way they see different things made from shapes. What are some of the things that they saw along the way? I am going to give you some shapes to play with and explore. I want you to see what you can make with the shapes.

Students Explore in Groups: Each pair will need shapes to explore and play with to see what they can create.

Each group will go on a scavenger hunt around the school looking for the shape you have given them. Each student in the group can take a picture with the ipad camera of the shape they see on our scavenger hunt.

Share/Summarize (reflection back on rug to confer): Meet back at the rug to talk about what things they have made with different shapes. Put students into groups and give each group a shape. Tell the students that we are going on a scavenger hunt to look for shapes around our school. We will take an ipad with and will take turns taking pictures. Tell the students that they will have more time to work on this tomorrow.

Day 6

Lesson Objective: Students will find different shapes in the real world by doing a shape scavenger hunt around the school with ipads.

Launch- Today we are going to learn another song about shapes to help us remember.

Shapes Song

(Tune: 'Here We Go 'Round the Mulberry Bush') Author: Unknown

This is a (*square*) as you can see.

It has (*4 sides all the same*).

This is a (*square*) as you can see.

Now draw it in the air with me!

Other verses:

Rectangle: 2 short sides and 2 long

Circle: goes around without an end

Triangle: 3 corners and 3 sides

Oval: goes around, but is squished in

Yesterday we read the book *Mouse Shapes* and started to do a scavenger hunt around the school with ipads. We are going to make sure everyone gets a turn today and then we will make a shape book for our classroom library.

Mini Lesson (direct instruction of skill): Continue scavenger hunt from yesterday.

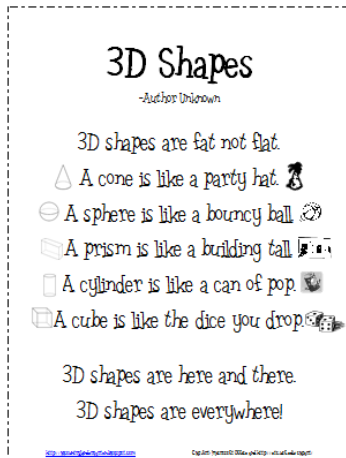
Students Explore in Groups: Students continue shape scavenger hunt with assigned shape around the school.

Share/Summarize (reflection back on rug to confer): Talk about the different real world shapes each group found as they went on their shape scavenger hunt. Show the pictures each group found on the Smartboard. Tell the students that you will be printing out the pages and will be making a shape book for the classroom library. Ask what they thought about this activity. Ask what they discovered about shapes around their school. Ask what shapes they might see outside and make a list, such as tire on the bus is a circle.

Day 7

Lesson Objective: Students will identify 3-D shapes

Launch-We are going to learn a new song about 3D shapes. Listen as I sing it the first time and then you can sing along. Ready?



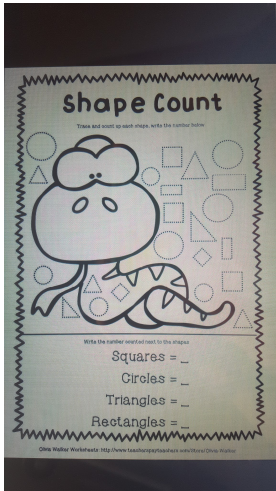
Today we are get to have a special treat. Everyone is going to get 4 pieces of food. You get to eat each one and then I want you to think of your favorite one. You can only pick one, so I want you to try each one first and then put your name card under your favorite on the pocket chart. We will talk about which one was the favorite.

Mini Lesson (direct instruction of skill): Give each student a piece of gum-cylinder, bugle-cone, cheese ball-sphere, carmel-cube. Explain that we need to sit at our table while we have our special math treat. We will chew our gum last and when the teacher says time is up all you need to put your gum back into the wrapper and throw it into the garbage. If we do not listen to the rules we will not get to have a special math treat again. Have the students repeat the rules back to you.

Students Explore: Have their special treat. Follow the teacher's directions. Place name card under favorite math treat in pocket chart. Then go to circle.

Share/Summarize (reflection back on rug to confer): Once everyone has voted, count the number of each choice and write the number next to the choice. Talk about which one has the most and the least. Are there any that are the tied? Let the students explore both 2D and 3D shapes using ramps, which one will slide down the ramp? Which shapes will roll down the ramps? Let the children explore while post test is given.

Post Test



<https://www.teacherspayteachers.com/Product/Shape-Worksheets-Geometry-Worksheets-Kindergarten-Grade-One-FREE-1927158>

Pre-test

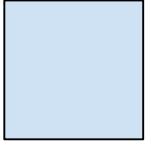
Take small groups of children to do this: Given different pattern blocks have students present to you the block that you have requested from them. Then find that block on their paper and ask them to write down how many side it has and how many corners/vertices. Do not give in order on paper.

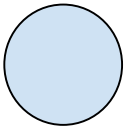
Have them use their blocks to fill in the larger shape. Just have students fill in enough to show understanding that the larger shape is made up of many smaller and different shapes. Record on their paper if they were able to complete the task.

Name: _____

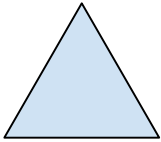
Sides

Corners/Vertices

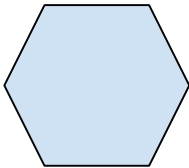




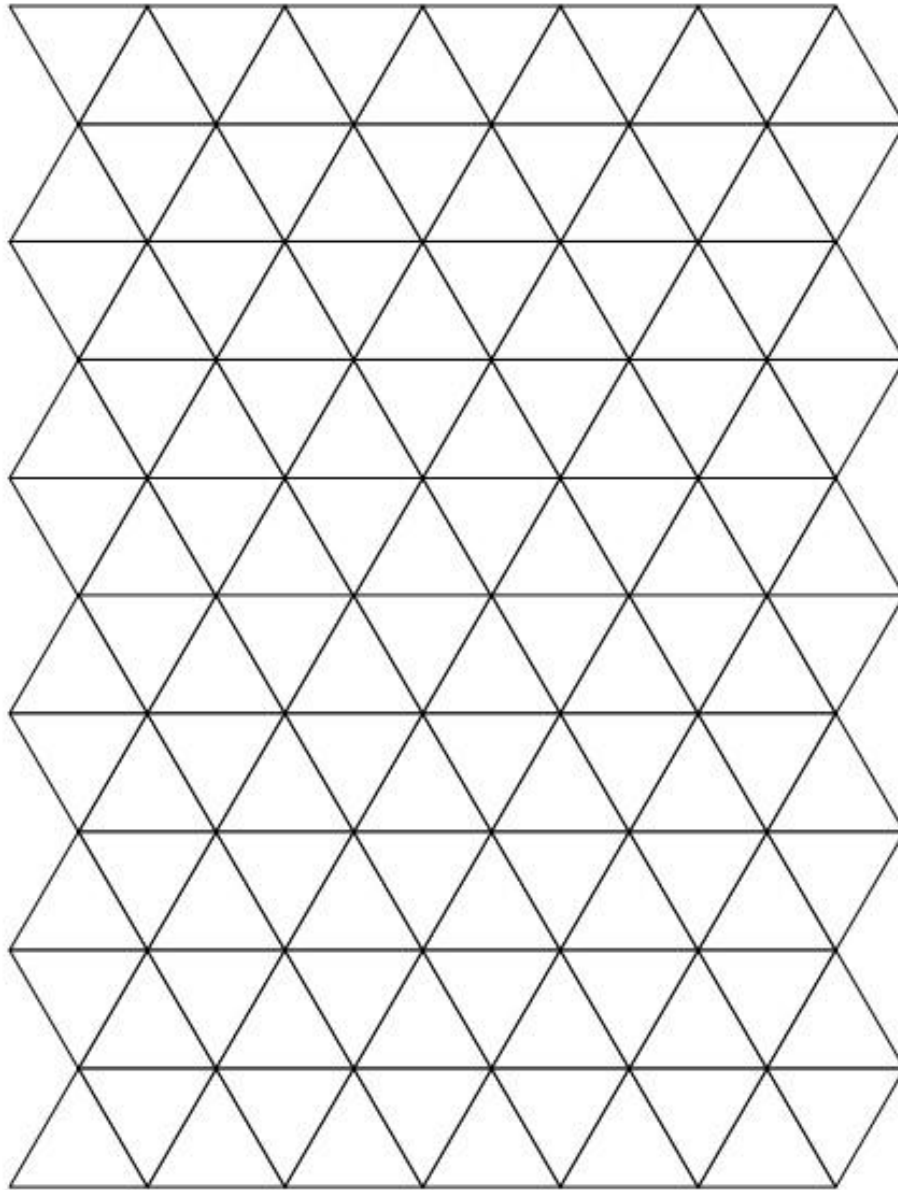








Pattern Block Triangle Paper



Day 8

Lesson Objective: Create basic shapes and extend into real world objects.

Launch- We've been talking about shapes in the real world. I noticed when I was driving to school today that there is somebody building a house. Do you think that the contractors just go out and start digging holes and putting up walls? Do you think that they need a plan to do this? What if you want to build a car? Would you need a plan first? Today we are going to be contractors/builders.

Mini Lesson (direct instruction of skill): I would like to introduce to you, today, a geoboard. What do you see? (square, pegs, color) We will create our homes, schools, cars, ... using a geoboard and rubber bands. What does a rubber band do? (stretch) What do you notice about these rubber bands? (color, thickness, different sizes) So do you think I would use the small rubber band to make, say a big square? What size rubber band would I use? So if I hear you correctly you are telling me that if I want to make a smaller shape I would use the smaller rubber band and the larger rubber bands for larger shapes? Students should pair up to work.

We will first start out by just letting you explore with your geoboard making different shapes. Share what you have made with your partner.(3-4 min)

Now I would like to play Simon Says. Simon says make me a triangle (have students talk about what makes a shape-sides, vertices, length on every shape). Show examples of students work that they differ in size but are still the shape you asked for. Simon says make me a rectangle (repeat questions/examples). Continue on with all the shapes you have covered. (5-6 min)

Now let's make a house. Plan out your house any way you wish. Is there windows, doors... Make your house different from your partners so that you know which house is yours.(6-10 min)

Lastly let's create some type of transportation. What could we make? (cars, truck, plane ,boat...)

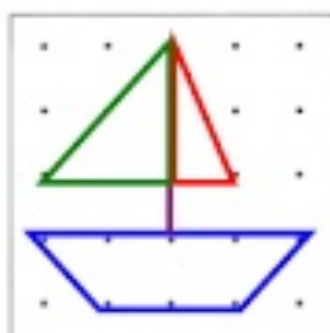
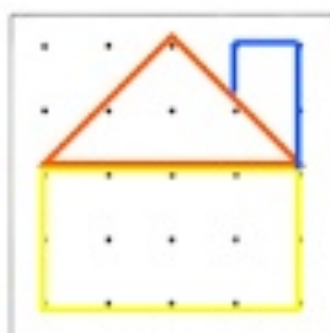
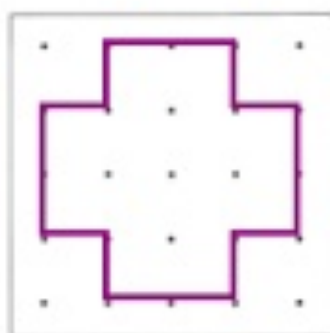
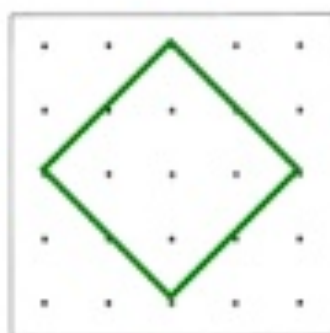
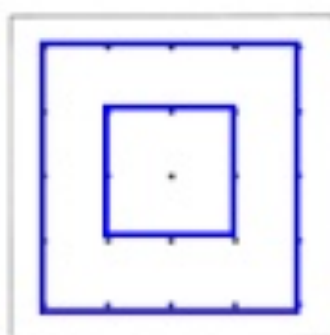
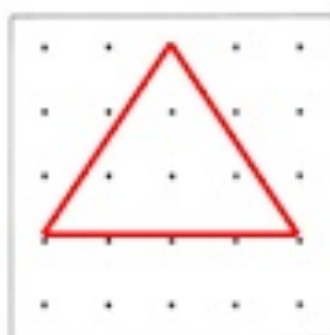
Students Explore in Groups: Students will be working on making and identifying shapes. Students will work in their groups to try to make their house different from what their neighbor has. Discuss with each other all the shapes they used. Do the same for the transportation.

Share/Summarize (reflection back on rug to confer): Bring finished houses back to the rug and have some students share their work with the class. How many squares/rectangle/triangle (etc.)did they use? Do the same for the transportation.

Guiding Questions:

Do houses have to be square?

Can you make something with a (name a shape) in it? What would that look like?



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Day 9

Lesson Objective: Creating and identifying shapes and their attributes. Use basic shapes and spatial reasoning to model objects in the real-world.

Supplies: whiteboards, expo markers

Launch- I love to play games. Do you like to play games? What kind of games? One of my favorite is Simon Says. Do you know how to play that? We will be playing Simon Says with your partner.

Mini Lesson (direct instruction of skill): Before we start to play let's make sure we know our shapes. Take out your white boards and markers and draw me a circle. Hold it up high so I can see it. Good. Now let's draw a (continue with all your shapes). Quickly review sides and vertices with the students. We will split up into groups of 6. Simon Says: make a triangle. (Pause while students create shape) How can everybody be involved in making the shape of a triangle?(kids should demo on the floor) Did you use everybody? How many triangles did your group make?

Simon says: make a square. (Pause while students create shape) How can everybody be involved in making the shape of a square? (kids should demo on the floor) Did you use everybody? How many squares did your group make? Can you use everybody?

Simon says: make a rectangle. (Pause while students create shape) How can everybody be involved in making the shape of a square? (kids should demo on the floor) Did you use everybody? How many squares did your group make? Can you use everybody? *Continue with other shapes.*

Students Explore in Groups: Students are creating and talking about the shapes they are making while playing Simon Says.

Share/Summarize (reflection back on rug to confer): What did we learn about this activity?(team work) How were we able to involve everybody when making

shapes?(you can make 2 shapes, one large shape) What was the hardest shape to create? Why?

Guiding Questions: see share/summarize

Day 10

Lesson Objective: Creating and identifying shapes

Supplies: Construction paper copied with shapes. You may have yellow(cheese) rectangles, red (circle) pepperoni, ...

Launch- Who likes pizza? What are some of the toppings you like? Today we will listen to The Little Red Hen Makes A Pizza. Watch carefully for shapes. Read: The Little Red Hen Makes A Pizza (if you don't have the book it is on line)

<https://search.yahoo.com/yhs/search?p=little+red+hen+makes+a+pizza+video&ei=UTF-8&hspart=mozilla&hsimp=yhs-001>

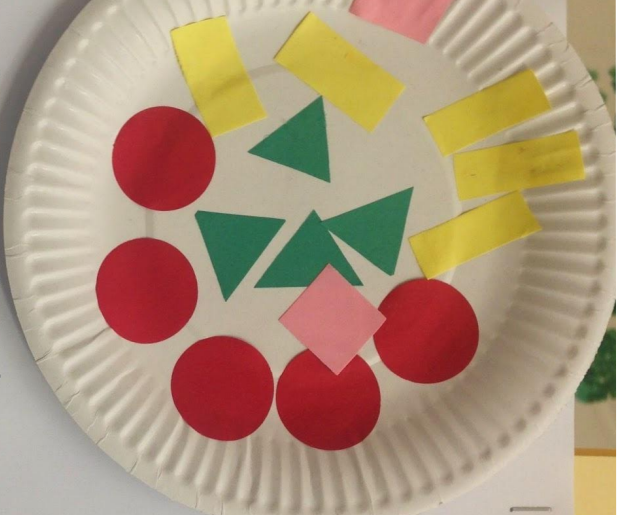
Mini Lesson (direct instruction of skill): Discuss the shape you saw in the book. Reread if necessary. You will now create your very own pizza. You will need to come up and get your shapes to cut out and put on your pizza. You must have one of every shape(meat/vegetable) You may put more on of the things you like.

Walk around room to make sure students are using all of their shapes. Have them tell you what shape they are using.

Students Explore in Groups: Students create pizza and double check each other's work to make sure they see all of the shapes. They should look at their neighbors pizza and paperwork to see if they come up with the same number of shapes as the pizza maker.

Share/Summarize (reflection back on rug to confer): Did anybody get fooled by their neighbors pizza? Were you able to find and count all of the shapes they used? Show some students work to reflect on using different quantities of shapes and how they are all different.

Guiding Questions: Could we have used other shapes? What are they? What do they look like? (sides, vertices) Illustrate.



My Shape Pizza!

sed 2 squares.



sed 5 rectangles.



sed 5 circles.



sed 4 triangles.



Staple

Pizza

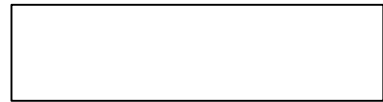
Here

My Shape Pizza!

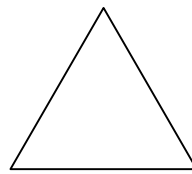
I used _____ squares



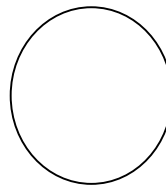
I used _____ rectangles



I used _____ triangles



I used _____ circles



Name: _____

Day 11

Lesson Objective: Recognizing and creating basic shapes, introduce 3D shapes (cube, rectangular prism)

Launch- 3D shape video

<https://search.yahoo.com/yhs/search?p=shapes+video+for+kindergarten&ei=UTF-8&hspart=mozilla&hsimp=yhs-001>

Wow! When I watched that video I think I recognized some of those shapes. Did you? Did some of those 3D shapes look like shapes we already know? (square, triangle, circle..) Rematch clip id you have to.

Mini Lesson (direct instruction of skill)

Today is going to be so much fun. We are going to be playing with toothpicks and marshmallows. Do you know what a toothpick is? You all know what marshmallows are! The rule is you can not eat the marshmallows. They are a tool we need. With the toothpicks and marshmallows you are going to create various shapes. Take it a step further and introduce the problem of making a cube. What do we know is a cube? (dice, boxes) Show students a cube and see if they can create one using their tools.

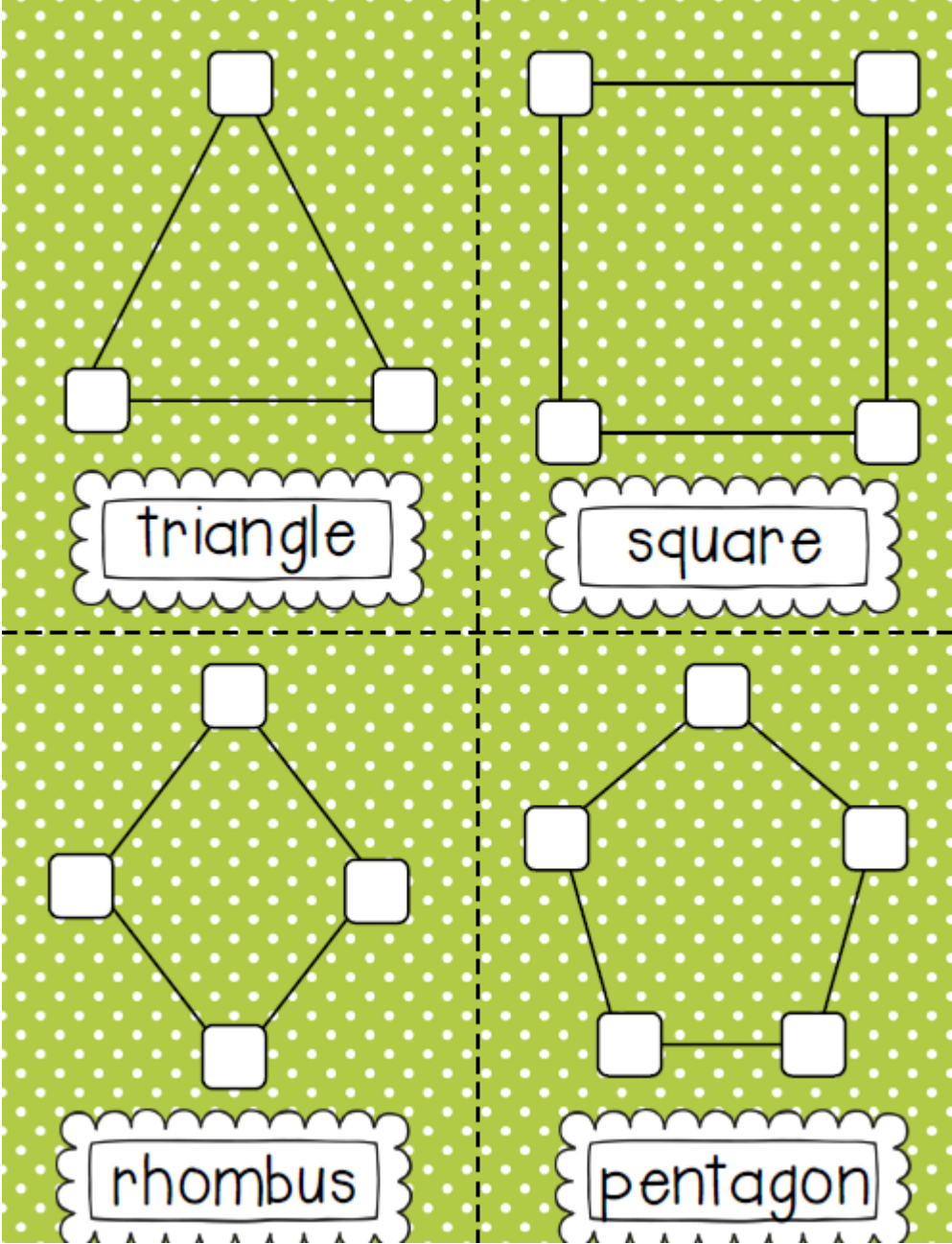
Take it another step and see if they could create a rectangular prism or pyramid.

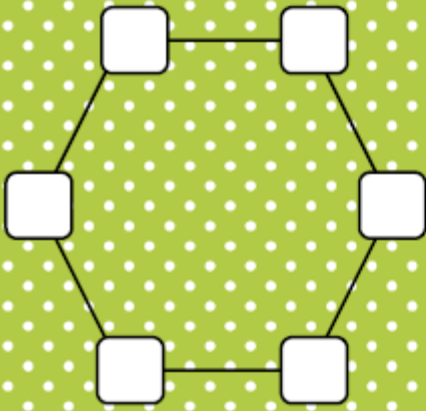
Have 3D shapes out for students to bring back to their desk and try to copy with their toothpicks and marshmallows.

Students Explore in Groups: In groups students will think, pair, share and explore strategies to make triangles, squares, rectangles... Make sure there is communication from all partners in creating these shapes.

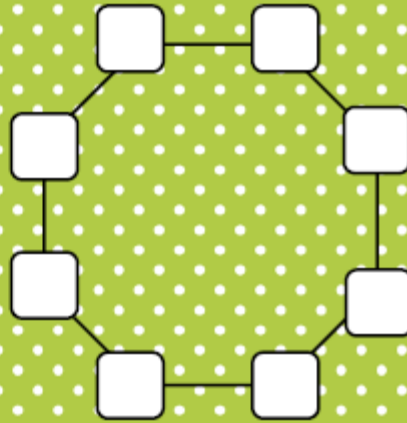
Share/Summarize (reflection back on rug to confer): How did you make your ____ shape? Share some shapes that students made. Talk about the 3D shapes and connect to real life.

Guiding Questions: While working in groups ask them questions encouraging the building of 3D shapes. How are you going to show the back? How do you show the bottom?

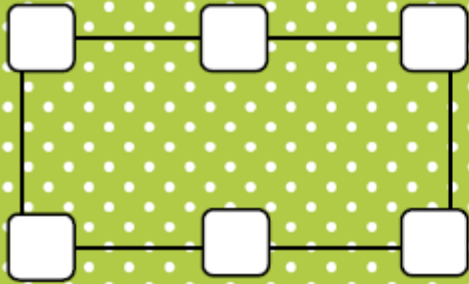




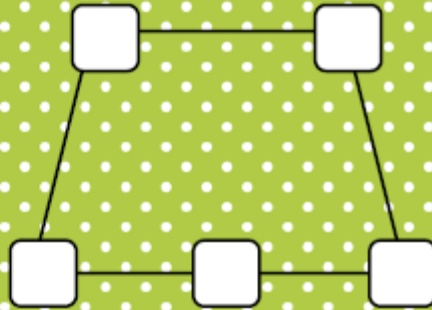
hexagon



octagon



rectangle



trapezoid

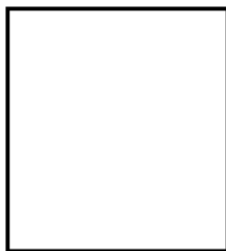
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Challenge:
Build a 2D shape using toothpicks and marshmallows. Then, tell about your shape!

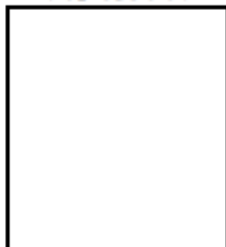
My Shape:

Draw it!

How many sides?



How many vertices?



Self
Assessment:



R. Rosenblit 2013

Name: _____

Challenge:
Build a 3D shape using toothpicks and marshmallows. Then, tell about your shape!

My Shape:

Draw it!

How many sides?

How many vertices?

Self
Assessment:



R. Rosenblit 2013

Day 12

Lesson Objective: Recognizing and creating basic shapes, review 3D shapes (cube, rectangular prism), knowing sides and vertices

Launch- What was your favorite part of yesterday's lesson? I really enjoyed working with toothpicks and marshmallows so I would like to do some more exploring. How about you? Do you like to explore?

Mini Lesson (direct instruction of skill) Let's go back and create some of our shapes again, but today in groups you are going to study your shape a little harder. I want you to be explorers and look for all the sides and vertices on your shape. What was a vertex? (corner)

Working with your partner you will take turns making/drawing the shapes. One of you will draw while the other creates and then switch. You must both agree on how many vertices there are. In each box (worksheet) you will draw out the shape you have created. It must be a real shape like a square, triangle, hexagon, ... We will then count how many vertices there are and write that number inside of the box you drew your shape in.

Students Explore in Groups: Working in groups students will recreate shapes and draw them on their paper. There will be discussion on how to make shapes and what they are called. They will collaborate on the number of vertices to write in that box.

Share/Summarize (reflection back on rug to confer): Looking at several student examples, go over the shapes that they have drawn. Did we get all the same shapes? Did anybody come up with something different? Did anybody do a 3D shape? How many vertices did your 3D shape have?

Guiding Questions: Can you make that square/triangle/rectangle into a 3D shape?
What is that called? How do we draw that on paper?

Name: _____

Shape Explorers

Draw the shape you make. How many sides? How many vertices?

Day 13

Lesson Objective: Use basic shapes and spatial reasoning

Launch- I like to do puzzles. I like to challenge myself to see if I can get all of the pieces to fit. Do you like puzzles? What kind? What if you had to do a puzzle but there were no connecting pieces. You would have to be like all the king's horses and all of the king's men and try to put Humpty back together again! Do you think you could?

Mini Lesson (direct instruction of skill) Today we are going to use our pattern blocks and fill in larger shapes. Use one of the hexagon shapes and demonstrate how to use different blocks to fill it in. Point out that the blocks do not cross over the line and that they must all be touching.

The first shape we will start with is a circle. When you have given the groups enough time to work out the problem and hear discussion about it not working then bring students back to the center to discuss their findings. Did it work? Why not? Why can't we fill in a circle with these shapes? (lines, sides, vertices and the circle has none)

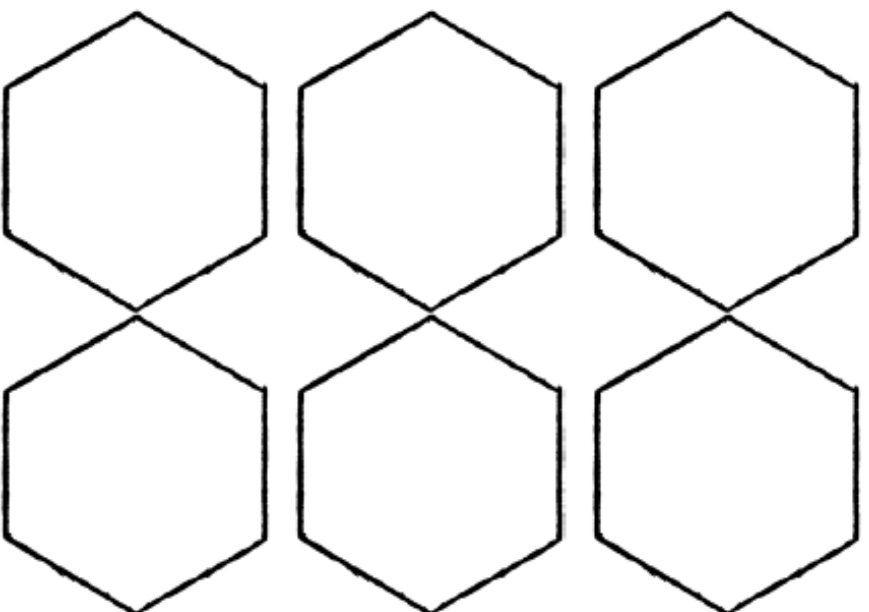
Now let's try a hexagon. You will see that there are six of them on your page. The challenge to you is that you and your partner can not use the same pattern in any of the hexagons. (Demo)

Students Explore in Groups: Students will work with partners to fill in the circle and the hexagons. There should be think, pair, sharing going on during the building and constructing time.

Share/Summarize (reflection back on rug to confer): Leave students work on their desk and walk around the room to show the different examples of the circle and the hexagons.

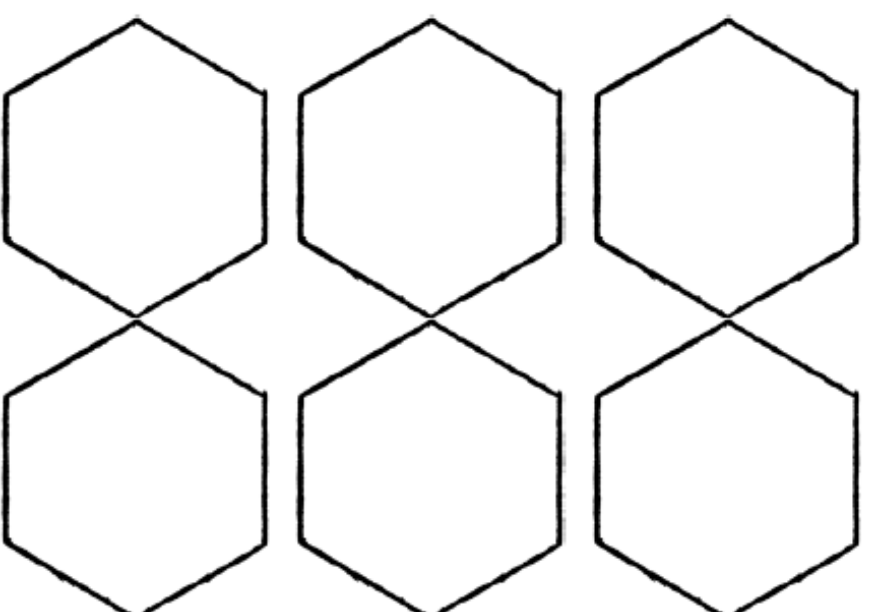
Guiding Questions: Why can't you use these shapes in your circle? How many different ways can we create a hexagon?

How many different ways
can you fill a hexagon?



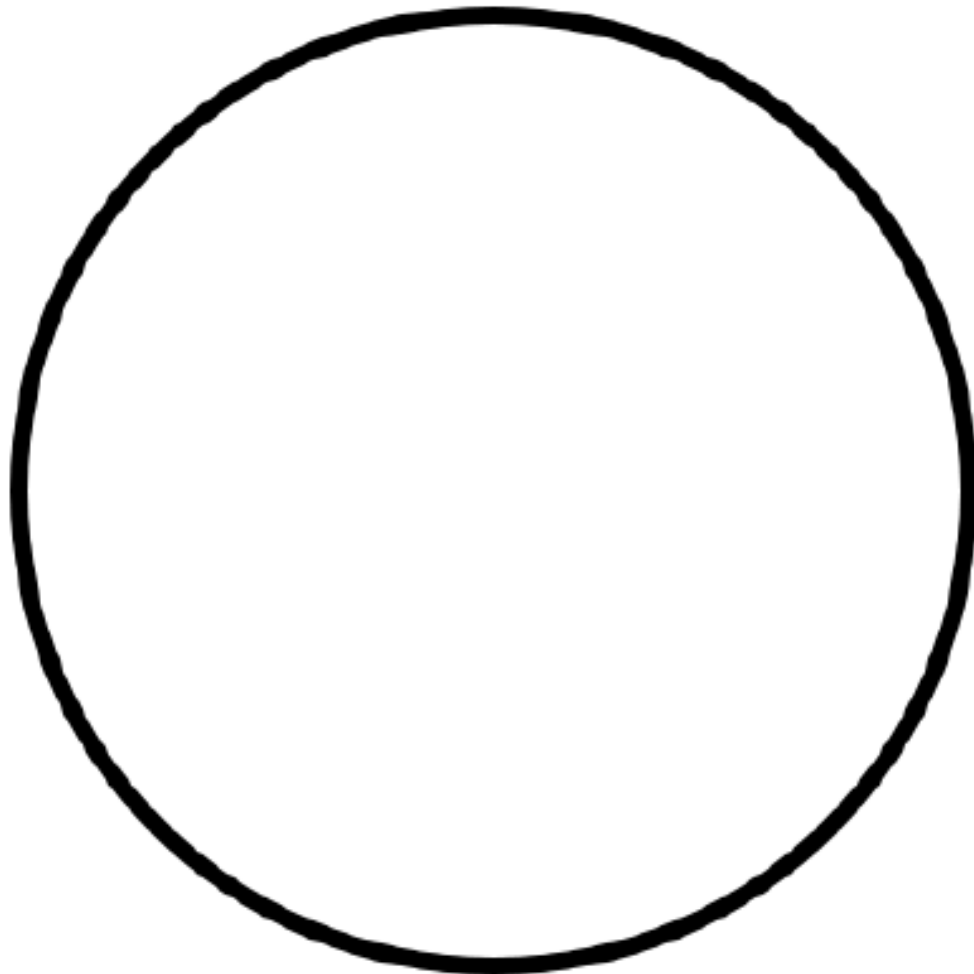
www.kindergartenkindergarten.com

How many different ways
can you fill a hexagon?



www.kindergartenkindergarten.com

Can you fill a circle with
squares?



What shapes can you make with squares?

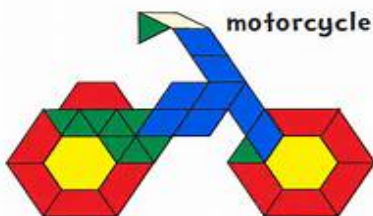
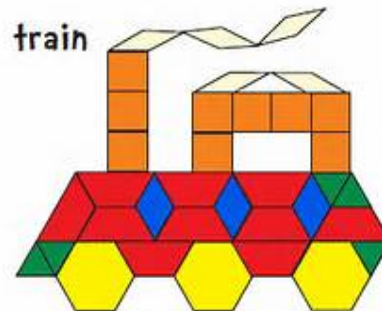
Show your shapes on the next page.

Day 14

Lesson Objective: Use basic shapes and spatial reasoning to model objects.

Launch- When my kids were little we used to love to watch Disney movies. Iron Giant, Robots, Wall-E, Lilo and Stitch and Cars just to name a few. Do you have some you like? We really liked movies like Lilo and Stitch. I thought the rocket ship was really cool.

Mini Lesson (direct instruction of skill) Wouldn't it be fun to make your own rocket ship or race car? Maybe you liked some of the monsters from Monster Inc.. I am going to let you explore and create some of your very own monsters, animals or spaceships. Before we start I would like to show you some creations you could make with shapes. Pull up pattern blocks on the web and show them some of the designs they could create.



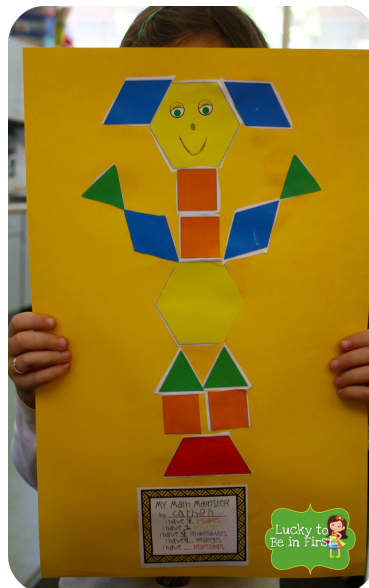
https://images.search.yahoo.com/yhs/search;_ylt=A0LEVrdn8nNXLHIAOqYnnIIQ;_ylu=X3oDMTEybjFwN3I0BGNvbG8DYmYxBHBvcwMxBHZ0aWQDQjlyNzRfMQRzZWMDc2M-?p=Pattern+Block+Designs&fr=yhs-mozilla-001&hspart=mozilla&hsimp=yhs-001#id=13&iurl=http%3A%2F%2Fraebear.net%2Fgoodies%2Fpatternblocks%2Fmotorcycle.gif&action=close

Given shapes let students create at their desk with blocks. Allow time and encourage making several different objects. Stop after 4-5 minutes and give them a clean sheet of paper. Put a container of pre cut, various shapes in the center of the table. Before handing out glue sticks, have students assemble their monster/animal. Encourage them to add detail to their picture if it is small and there is room (bird and flower). Students will label their pictures or if they drew a monster, they will name their monster.

Students Explore in Groups: Sharing ideas and encouragement while working.
Discuss or ask for specific shapes.

Share/Summarize (reflection back on rug to confer): Share several students work. Look at the different shapes the used to create their project. Leave time for other students to ask questions about the project.

Guiding Questions: Is there another way to create that monster/truck using different shapes? Can we create a (car/rocket) any other way? What shapes would we change or add?



Day 15

Lesson Objective: Use basic shapes and spatial reasoning

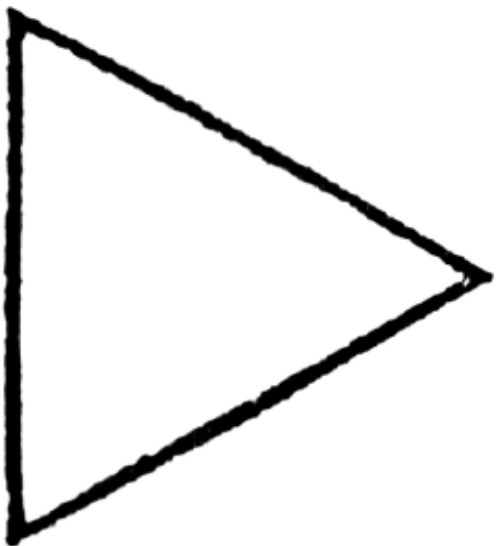
Launch- I have a problem. My friend came in this morning and said that they are going to build a new deck but she has a problem. First of all the deck is shaped like a triangle. What do we know about triangles? (3 sides, 3 vertices). The brick they are going to use are in many different shapes. She can't figure out how many pieces of each she shape she will need. I told her you guys were expert contractors and could come up with several different patterns and shapes to use on her deck.

Mini Lesson (direct instruction of skill) Here is our triangle shaped decks. How many different ways could we come up with to use squares, trapezoids, rhombuses, hexagons and triangles. Working together in pairs of 4 see if everybody at your table can come up with a different pattern for my friend.

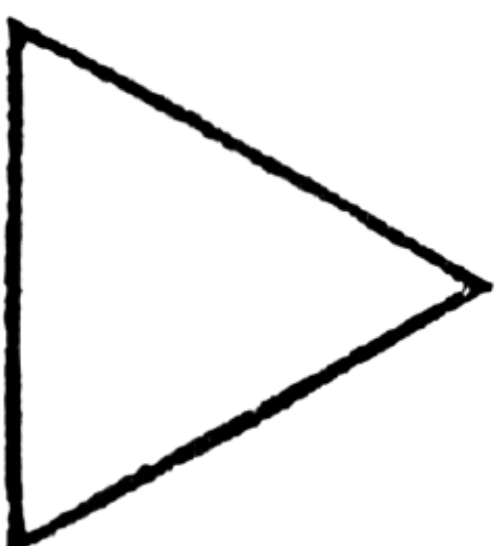
Students Explore in Groups: Students will be creating patterns and comparing them with the others at their table to make sure that none of them are the same. This will involve communication and exchange of shapes and using their math vocabulary.

Share/Summarize (reflection back on rug to confer): Look at several pieces of work students have created. Try to find as many different patterns as time permits. Take pictures and put up to show all the ways to make a triangle.

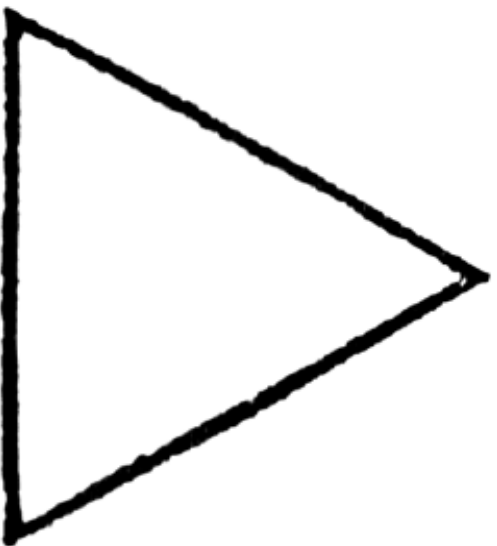
Guiding Questions: Is there another shape or shapes we could use to take the place of a (hexagon)? How many triangles make up a hexagon? How many triangles make up a trapezoid? (examples)



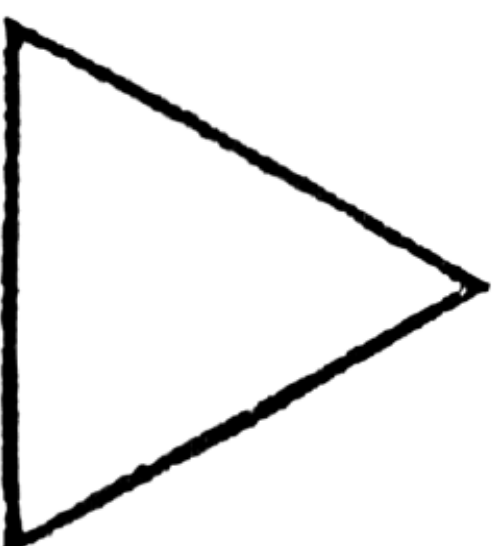
What shapes can you use to fill a triangle?








What shapes can you use to fill a triangle?













What shapes can you use to fill a triangle?








What shapes can you use to fill a triangle?

 square	 triangle	 rhombus	 trapezoid	 hexagon

 square	 triangle	 rhombus	 trapezoid	 hexagon

 square	 triangle	 rhombus	 trapezoid	 hexagon

 square	 triangle	 rhombus	 trapezoid	 hexagon

Post-test

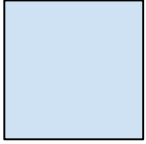
Take small groups of children to do this: Given different pattern blocks have students present to you the block that you have requested from them. Then find that block on their paper and ask them to write down how many side it has and how many corners/vertices. Do not give in order on paper.

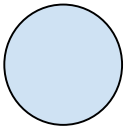
Have them use their blocks to fill in the larger shape. Just have students fill in enough to show understanding that the larger shape is made up of many smaller and different shapes. Record on their paper if they were able to complete the task.

Name: _____

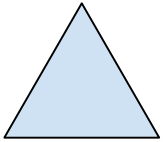
Sides

Corners/Vertices

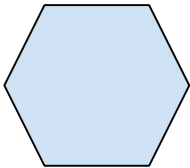




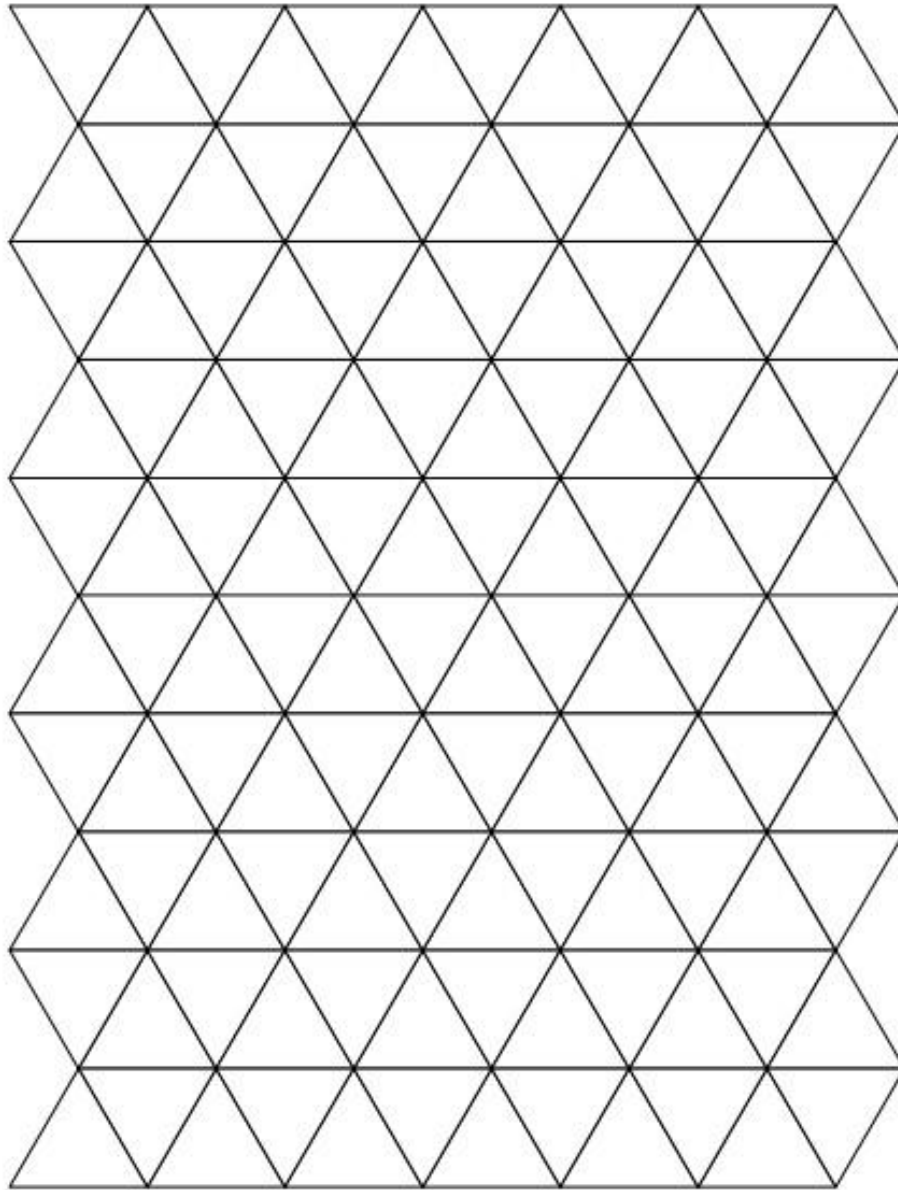








Pattern Block Triangle Paper



Day 16 (see after lesson 22 for post test)

Lesson Objective: identify an AB pattern

Launch- I am so busy. I love it when I have Patrick to help me. Patrick and I have decided to take turns picking up the Parker and Avery from Kristi's house. One day Mrs. Christiansen picks them up and the next day Patrick picks them up. I want you to help me map out on my calendar what days are going to be my days to pick up the kids and what days will be Patrick's days for picking up the kids.

Mini Lesson (direct instruction of skill)

In order to begin I need to make sure we all understand the basic information we have.

This is my calendar; all the squares represent a day where the kids go to daycare.

(We're not worrying about weekends!)

How many people do I have to pick up the kids, that is right only two.

I am going to have to come up with a code for Patrick and a code or symbol for me so I don't have to write my long name each time. How about P for Patrick and C for Christine.

Model for students how to start first couple of days. I take a turn, Pat takes a turn. To further solidify the fact that this is basic turn taking have another student come up to take turns with me alternating writing PCPC in the calendar.

Students Explore in Groups:

Set students up with their materials at the rug, a blank calendar, and clipboard, and pencil.

Re visit the calendar when completed with the alternating codes, PCPCPC

I wonder if there is one more step I can do to make sure I can really see quickly with my eyes what days are mine and what days are Pat's. Would it help at all to color them alternating colors. After completing the calendar send them off to seats to color all Patrick's squares blue and my squares red.

We have just created something that many people use a lot in math, do you know what that is. A pattern.

Guiding questions: What do you notice?

How can you be sure you're codes and your coloring is correct?

Share/Summarize (reflection back on rug to confer):

What we created today was a pattern. It's math name is AB pattern. It is that because all the A's stand for the first person and all the B's stand for the second person.

Day 17

Lesson Objective: Identify patterns ABC

Launch- I still am going to take turns picking up Parker and Avery but this month because Patrick is really busy my mom is going to help out. We're going to take turns all three of us.

Mini Lesson (direct instruction of skill)

Does anyone have an idea of what that would look like on our calendar?

Lead discussion answer questions.

Basically we are going to create an AB pattern like yesterday but because we are adding another person to the pattern they get their own letter as well. What letter do you think they will get? You're right a C, because we just go in ABC order when we are labeling our patterns.

Students Explore in Groups: Students gather on rug with calendar to complete the first two weeks or rows.

Students can go back to work in groups at tables to continue pattern.

Third step students distinguish the pattern by coloring all the differentiating days A,B,C three separate colors, thus hopefully making a clear visible ABC pattern

Guiding questions during exploration:

What is the same as yesterday, what is different from yesterday?

What did you do to get started once I wasn't helping you anymore and you were at your seat ready to continue the other squares.?

Share/Summarize (reflection back on rug to confer):

What did my pattern look like today YES it was an ABC pattern, why did my pattern have 3 letters, yes because it had three parts.

Day 18

Lesson Objective: ABB pattern

Launch-

Every morning at school we have morning meeting correct? Well I have an idea to be able to add some more games into morning meeting. I think that it would be nice to have you guys pick games. But I can't have you pick a game everyday because there are still some songs or new games I would like to teach you. I thought maybe we could come up with a schedule, sort of how we came up with a schedule for Patrick and myself to pick up the kids from daycare.

Mini Lesson (direct instruction of skill)

Today I am going to give you and your partner a blank calendar same as you have seen the last two days. I would like you to make a schedule showing who is picking the morning meeting game. I will go first on the first day of the month and teach a new game, the next two days students will get to go. I want you to continue the pattern for the whole month.

Students Explore in Groups:

Facilitate discussion to clarify what the pattern will be, how to get started, and how to differentiate symbols.

Have students code the pattern and extend by coloring to differentiate the ABB pattern.

Guiding questions:

Higher level question-What is the math name for this type of pattern. Teacher turn, kid turn, kid turn. What's another way to say that kind of pattern?

Struggling student; After the teacher whose turn is it, after one student whose turn is it?
After two students whose turn is it?

Share/Summarize (reflection back on rug to confer):

Today we made a new schedule using the ABB pattern.

Why did we use three letters even though we only had two different groups, the students and the teachers.

Why are we not calling this T,S,S, T,S,S for teacher and student?

Day 19

Lesson Objective: AABB pattern

Launch-

Today I need some ideas for how I am going to plant my garden this summer at home. Patrick made me this beautiful long flower box to go along side of the garage. I have room to put 10 plants in there. Can you help me come up with a pattern to put my plants in the rectangle flower box.

Mini Lesson (direct instruction of skill)

You can choose any kind of flower you want but you can only put two different types of flowers into the garden. And I like to see them in pairs. So I'd like you to do AABB, in other words I might see myself choose marigold marigold, daisy daisy, marigold, marigold, daisy daisy. The Marigolds are the first flower so they get the title A, and since my pattern is AABB, I have two marigolds right next to each other. Next to them I see the letter in the pattern changes, so I know my flower must change. I am going to make daisy be the next pair or next two flowers. I will use a capital B to show where I put the daisies.

Students Explore in Groups: pass out manipulatives to those who still need concrete pattern initially. Have additional drawing paper for students who need to have students physically the flower first.

Have students create the pattern in the work page.

May have to brainstorm or build background knowledge for types of flowers.

Share/Summarize (reflection back on rug to confer):

Guiding Questions:

What were some samples we came up with. Why did that pattern work. Did this pattern work?

Planting my flower garden

My flower pot has a pattern
AABB

My flower pot has a pattern
AABB

Day 20

Lesson Objective: create your own with fruit loop necklace

Launch-

I love jewelry, I also love to have snacks! That's why today I have the best thing for us to try. We are going to create a necklace that we can EAT!

Mini Lesson (direct instruction of skill) You are going to create a pattern of your choice using fruit loops. You can make your pattern simple like green red green red, which would be AB or you can choose to make it more challenging such as AABBCC, or ABBC, or ABCDD.

Students Explore in Groups: pass out string, and fruit loops.

As students are creating mingle around room to ask higher level questions or help struggling students.

Higher level question or challenge opportunity; See if you can make a pattern that would have 6 letters in the name.

Struggling student prompt: Can you think of a pattern we made earlier this week that you liked. Let's try to build a pattern using colors you like or flavors you like.

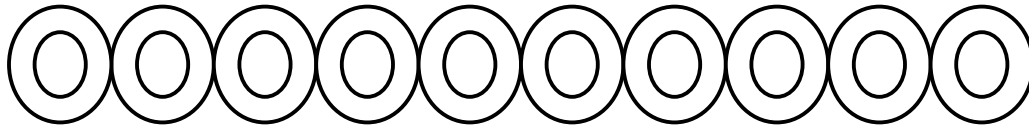
Midway Meet and Confer- as students complete their pattern with their necklace, have them transfer their concrete pattern and knowledge to a recording page. After they successfully record and share through explanation their pattern to their partner they can eat their necklace!

Share/Summarize (reflection back on rug to confer):

Guiding Questions: We created patterns on our necklace. Today you had more freedom to create different patterns, Are our necklace still patterns even if they don't match mine? Or we all have different necklace yes. To make it a pattern it needs to repeat itself on your necklace!

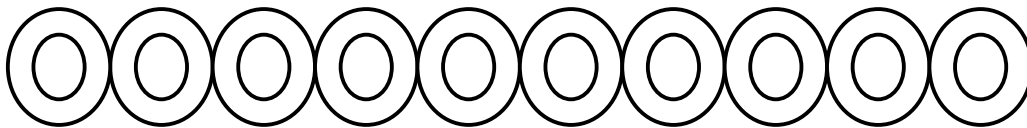
My Fruit Loop Necklace

This is what my necklace looked like-



This is the math name for my pattern necklace:

Next time I am going to make a Necklace like-



And it will be called

Day 21

Lesson Objective: How many patterns can you make if I gave you three different shapes

Launch- I love to decorate my classroom. I need your help I want to decorate my bulletin board above the SMART board. You can see it is a long rectangle and it is simply made of old boring brown cork. I think it would be so much prettier if I could hang shapes up there in a pattern.

I have these three different shapes I found made out of card stock they were in my drawer, I wonder if you guys could create some options for me and then we can choose one that we think would look fabulous to hang upl.

Mini Lesson (direct instruction of skill) To make a pattern we know it must repeat itself. We cannot just hang up one square one triangle and one circle. We can also not hang up circle, triangle triangle, square, circle circle, square, square, square, square. That is not a pattern it does not follow an order and it has no repeating sequence.

Students Explore in Groups: Let students explore in groups initially with the hands on materials, the shape cut outs (pre made and prepared) 2 minutes.

Circle around room if students are having success finding patterns allow more exploration time, if students are struggling pull back whole group and use guiding questions such as;

Could we try a pattern we used earlier this week. I remember we learned an ABC pattern would that work.

Higher level questions- Do you have to use all the shape, can you use more of one shape than the other? How many different varieties of patterns can I make.

Regroup: To Share different types of patterns that we created.

Make a master anchor chart representing all the patterns that have been created, as a reference for students who are trying to create something that hasn't been made yet.

Now focus on the patterns we have listed

Try to brainstorm other possibilities

Guiding questions: As they explore guide with questions such as: Have you tried ABC, or what if you did the opposite of that? Would we call that CBA, or would we just change the shapes positions? Could you try to make a pattern with twice as many squares and half as many triangles and no circles...ABB pattern?

Share/Summarize (reflection back on rug to confer):

Today we had many different options and creations of patterns. What is important to know that patterns must repeat themselves. They can often be identified or described using the first letters of the alphabet to show when and how a pattern repeats itself.

Day 22

Lesson Objective: How many patterns can you make if I gave you four different shapes.

Launch- Guess what I found another shape in my drawer. Yesterday we made different varieties of patterns to put above our SMART board on the cork board, and today I have to ask you guys to start thinking of some new patterns because this time I have another shape to include. You see I found these trapezoids.

Mini Lesson (direct instruction of skill) To make a pattern we know it must repeat itself. We cannot just hang up one square one triangle and one circle. We can also not hang up circle, triangle triangle, square, circle circle, square, square, square, square. That is not a pattern it does not follow an order and it has no repeating sequence.

Students Explore in Groups: Let students explore in groups initially with the hands on materials, the shape cut outs (pre made and prepared) 2 minutes.

Circle around room if students are having success finding patterns allow more exploration time, if students are struggling pull back whole group and use guiding questions such as;

Could we try a pattern we used earlier this week. I remember we learned an ABC pattern would that work, well now we have a D to represent the new trapezoid.

Higher level questions- Do you have to use all the shape, can you use more of one shape than the other? How many different varieties of patterns can I make.

Regroup to Share different types of patterns that we created.

Make a master anchor chart representing all the patterns that have been created, as a reference for students who are trying to create something that hasn't been made yet.

Now focus on the patterns we have listed

Try to brainstorm other possibilities

Guiding questions: As they explore guide with questions such as: Have you tried ABC, or what if you did the opposite of that? Would we call that CBA, or would we just change the shapes positions? Could you try to make a pattern with twice as many squares and half as many triangles and no circles...ABB pattern?

Share/Summarize (reflection back on rug to confer):

Today we had many different options and creations of patterns. What is important to know that patterns must repeat themselves. They can often be identified or described using the first letters of the alphabet to show when and how a pattern repeats itself.

Pre and post assessment for Discrete Math patterns section

Students will be asked in one-on-one setting or a small group setting to perform a set of tasks. Students abilities to be able to perform these test will be recorded and used to utilize instruction. This will also serve as baseline data for this particular math unit.

Scores will be; Accomplished, progressing, or needs improvement.

If student can complete skill to fullest extent, they earn accomplished, if they can partially meet skill they are progressing, and if they can't meet any part of skill or attempt they earn needs improvement.

Question/ performance skill	Student A pre test	Student A post test
Show students a pattern made from unifix cubes Ask "Do you know what this is?"		
Here are some cubes, watch what I do(begin making an AB pattern) Can you finish this AB pattern for me?		
Can you make me a pattern with these shapes (give them a bucket of triangle, circle, squares) AB, ABC, ABB ...etc are all acceptable.		