

Math Unit Plan Summary

Unit: Geometry	Subject: Math	Grade: 2	Number of Lessons: 9	Teachers: Jessica Perkins, Mitra Paysen, and Hailey Yan
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Purpose/Rationale of Unit

The goal of this unit is to expand students' prior knowledge on the relationship between 2D and 3D shapes in relation to our local environment through exploration, play, and collaboration. Throughout this unit, we will look at different attributes of 2D and 3D shapes, and practice ways of sorting shapes based on these attributes; students will also use positional language in their vocabulary when talking about shapes. Activities will encourage family involvement, incorporate first peoples principles of learning, and apply this knowledge and understanding to students' everyday lives. Students are not expected to use mathematical terms regarding 3D object names or attributes and will not be assessed on it, but they will be introduced to the terminology throughout the unit. Many of the activities chosen will help prepare students for grade 3 content while gaining an understanding of the content covered in grade 2. This unit was constructed from a variety of sources and not just adapted from one original unit.

Core Competencies

Communicating and Collaborating: <ul style="list-style-type: none"> - I can listen and respond to others - I can share my ideas and questions for a reason - I can cooperate with others - I can work with others towards a shared goal 	Creative, Critical, and Reflective Thinking: <ul style="list-style-type: none"> - I get ideas when I play and explore - I try a new idea when something doesn't work - I can explore my environment and ask questions - I can reflect on what I did and tell what I learned 	Personal, Social, and Cultural Awareness: <ul style="list-style-type: none"> - I can share my feelings - I can solve some problems and ask for help when I need it - I am kind to others and our environment
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Big Ideas

Objects and shapes have attributes that can be described, measured, and compared.

- We can describe, measure, and compare spatial relationships

Essential Questions

- What 2D shapes live in objects in our world?
- How can you combine shapes to make new shapes?

First Peoples Principles of Learning

- Learning is holistic, reflexive, reflective, experiential and relational (focused on connectedness, on reciprocal relationships, and a sense of place)
- Learning involves time and patience

This unit consists of hands-on activities that students will work collaboratively on in order to discover, experience, and explore new concepts and ideas relating to 2D shapes and 3D objects, which will take time and patience. Students will also be reflecting on their learning throughout the unit on how comfortable they are in these areas.

Cross Curricular Connections		
English Language Arts	Art	Science
Students can create stories, like <i>Grandfather Tang's Story</i> , to go along with their tangrams or other shape patterns they have made.	Students can complete many visual art activities related to shapes (some of which are included below), such as overlapping shapes or creating tessellations.	Students are exploring and making observations about their local environment to find 2D shapes. They can also explore the various ways shapes can move (roll, slide, etc.).

Learning Standards	
<p>Curricular Competencies</p> <p>Reasoning and Analyzing</p> <ul style="list-style-type: none"> - Use reasoning to explore and make connections - Model mathematics in contextualized experiences <p>Understanding and Solving</p> <ul style="list-style-type: none"> - Develop, demonstrate, and apply mathematics understanding through play, inquiry, and problem solving - Visualize to explore mathematical concepts <p>Communicating and Representing</p> <ul style="list-style-type: none"> - Use mathematical vocabulary and language to contribute to mathematical discussions - Represent mathematical ideas in concrete, pictorial, and symbolic forms <p>Connecting and Reflecting</p> <ul style="list-style-type: none"> - Reflect on mathematical thinking - Connect mathematical concepts to each other and to other areas and personal interests 	<p>Content</p> <p>Multiple attributes of 2D shapes and 3D objects</p> <ul style="list-style-type: none"> - Sorting 2D shapes and 3D objects, using two attributes, and explaining the sorting rule - Describing, comparing, and constructing 2D shapes, including triangles, squares, rectangles, circles - Identifying 2D shapes as part of 3D objects - Using traditional Northwest Coast First Peoples shapes (ovals, U, split U, and local art shapes) reflected in the natural environment

Prior Knowledge	Future Knowledge
<p>Kindergarten:</p> <ul style="list-style-type: none"> - Explore single attributes of 2D shapes and 3D objects through sorting, building, and describing using positional language. <p>Grade 1:</p> <ul style="list-style-type: none"> - Comparison of 2D shapes and 3D objects through sorting (one attribute), positional descriptions, and replication. 	<p>Grade 3:</p> <ul style="list-style-type: none"> - Construction, identification, and comparison of 3D objects using specific math language in descriptions of attributes. Understanding the preservation of shape and identifying 3D objects by their net skeletons.

Family Involvement

Students will be provided with take-home journal assignments throughout the unit that will require them to discuss specific geometry topics with families. They will bring back their family's comments for class discussions. One specific game students are encouraged to play with families is 'Where is it?' because it allows students to practice using their positional language at home and encourages them to look for shapes in their environment. Also throughout the unit, pictures and videos of students' progress and participation in class activities will be uploaded to FreshGrade to encourage family involvement and dialogue.

Personalized/ Differentiated

Students are able to choose what shapes and attributes they are working with throughout the unit. Students are also provided with Shape Cards of varying difficulty that they can use to help them with each activity if they are needing different supports. For example, students can use Symmetry Mats that are blank, have a shape/pattern on one side, or have four quadrants rather than two. This way students can work at their own pace and challenge themselves as needed. These Shapes Cards will also contain both visuals and text so that they are more accessible despite students' reading levels.

Assessment

Throughout the unit, the teacher will be taking pictures of students working and writing down anecdotal observation notes about each student. Students can reflect on their learning from some of these pictures by describing (pictorially, verbally, or with written descriptions) what they were doing in each picture in their Math Journals. These pictures can also be shared with families on FreshGrade. Within students' Math Journal they can share their learning, questions, and reflections. They will also be provided worksheets in which they will paste into their Math Journal and complete. Students will also be engaging in many class/group discussions about shapes where they can share their knowledge and any wonderings. At the end of most lessons, students will provide a silent 1-4 finger ratings where they will share how comfortable they are about that day's topic:

- 1 meaning "I am just starting and need some guidance"
- 2 meaning "I am getting there but have some questions"
- 3 meaning "I got it and can do it on my own"
- 4 meaning "I got this and can help a friend"

This provides a way for students to reflect on their progress and for the teacher to quickly glance at the class's progress to help guide the next lesson.

Learning Plan: Tabular Summary

Lesson #1: Introduction - Shapes In Our Environment <i>*see elaborated lesson below*</i>	
<p>Key Learning Objectives:</p> <ul style="list-style-type: none"> - Refresh student's minds on the topic of shapes by exploring shapes in our local environment. - To gain an understanding of students' prior knowledge of shapes and their attributes. 	<p>Materials/ Resources:</p> <ul style="list-style-type: none"> - Shape Finders: student created & laminated previously - Individual Observation Worksheets - Clipboards (optional) and writing devices - Talking item found in nature (& returned afterward)
Brief lesson activity description	Differentiation plan
<ul style="list-style-type: none"> - Begin with a read-aloud of 'The Shape of Things' by Dayle Ann Dodds & Julie Lancome. Project the last page of the book on the whiteboard for students to circle and name shapes they know. Students can share prior knowledge. - Take class outside on a nature walk: students point out shapes they see in the natural and constructed environment and fill in their Observation Worksheets. - Students will pass around a found talking item in a sharing circle, and each share their experience using the prompt: "A shape I saw today was ____." 	<ul style="list-style-type: none"> - Stay on pathways for student mobility needs. - Students may choose to write or draw their observations, based on their prior knowledge and previous experience.
<p>Assessment:</p> <ul style="list-style-type: none"> - Students will participate in discussions about shapes and their attributes using informal language. - The teacher will make anecdotal notes and observations regarding students' participation in discussions. - Students will hand in their Observation Worksheets at the end of the lesson. 	

Lesson #2: Shape Exploration & Spatial Awareness	
<p>Key Learning Objectives:</p> <ul style="list-style-type: none"> - Introduce and learn positional terms (e.g. flip, rotate, left, right etc.) to be used throughout the unit. - Students will develop their spatial awareness by exploring how shapes are related in position. 	<p>Materials/ Resources:</p> <ul style="list-style-type: none"> - Book: <i>Grandfather Tang's Story</i> - Tangram template printouts on cardstock - Tangram puzzles (some with and without solutions) - Individual Math Journals
Brief lesson activity description	Differentiation plan
<ul style="list-style-type: none"> - Read <i>Grandfather Tang's Story</i> while students colour and cut out tangram sets. - Introduce tangram puzzles to students and work through some together - highlight positional language such as flip, rotate, left, right, etc. - Get students to work in pairs to create tangram images. They can create their own or use the puzzles. - Play 'Where is it?': Student A chooses a secret object and peers ask yes/no questions to identify the object using positional language. - Introduce Math Journals. 	<ul style="list-style-type: none"> - Students may need a tangram set already made for them or an enlarged set. - Students can use the tangram puzzles containing solutions to help match the shapes with their tangram set.
<p>Assessment:</p> <ul style="list-style-type: none"> - Students will be using the positional language learned when working with their partner to complete tangram puzzles and the 'Where is it?' game. - In their Math Journals, students will write a story about a tangram image they created (own or from a puzzle). - Students will provide a silent 1-4 finger rating on how comfortable they are using positional language. 	

Lesson #3: 3D Shapes & Their Attributes

Key Learning Objectives: <ul style="list-style-type: none"> - Students will expand their knowledge of types of 3D shapes and their attributes (edges, faces vertices). - Students will begin to identify basic 2D shapes within 3D shapes 	Materials/ Resources: <ul style="list-style-type: none"> - 3D Wooden Shapes - Magnet Tiles and 3D Shape Cards - Chart Paper & Plickers for each student
Brief lesson activity description	Differentiation plan
<ul style="list-style-type: none"> - Begin lesson by allowing students to explore wooden shapes in their table groups. Some prompting questions: <i>What do you notice about these 3D shapes? What are the same? Different? How could we group them?</i> - After, students use Shape Cards and magnetic tiles to create different 3D shapes. - Bring class together for discussion on the different attributes of 3D shapes. Use magnetic tiles to describe faces, edges, and vertices. - Create a list of different 3D shapes & their attributes with class using chart paper. Get students to vote on the number of faces, edges, and vertices using plickers. Answers will then be added to the chart and left up for future reference. 	<p>2 types of Shape Cards provided: 1 with the open layout of how to connect tiles to make 3D shape, and 1 more advanced with just a picture of the 3D shape they are to create.</p>
Assessment: <ul style="list-style-type: none"> - Picture evidence of students creating magnet tile shapes. Pictures will be printed and pasted in Math Journals for student reflection. Pictures may also be posted on FreshGrade for families. - During discussion on 3D attributes, students will use their plickers to vote for the number of faces, edges, and vertices on a number of 3D shapes. Plicker data will be used to cross-check students' understanding. 	

Lesson #4: Creating 3D Shapes - Guest Speaker

Key Learning Objectives: <ul style="list-style-type: none"> - Students will listen to traditional Indigenous story of the meaning of shape in local cultures and gain an understanding of traditional Indigenous shapes (ie. ovoids, U, split U). - Students will gain hands-on experience in creating 3D shapes during traditional soap stone carving led by Guest. 	Materials/ Resources: <ul style="list-style-type: none"> - Local Indigenous Guest Speaker - varies by district - 1 bar soap / student - Carving materials the Guest requests
Brief lesson activity description	Differentiation plan
<ul style="list-style-type: none"> - The contents of this lesson may vary depending on district/guest. - Begin with a traditional oral story incorporating shape and the meaning behind them. - The guest will lead students through soap stone carving, and the common traditional Indigenous shapes to include in their sculptures. - Time to write in Math Journal. 	<ul style="list-style-type: none"> - For any students with tactile preferences, gloves may be provided. - Larger bars of soap for those who struggle with fine motor skills are also made available.
Assessment: <ul style="list-style-type: none"> - Completion of individual sculpture showing some evidence of attempts to include common Indigenous shapes. - In their Math Journal, students will draw/write what they enjoyed most during their time with the guest. 	

Lesson #5: 2D Shapes & Their Attributes **see elaborated lesson below**

<p>Key Learning Objectives:</p> <ul style="list-style-type: none"> - Students will use their knowledge of 3D objects and apply it to 2D shapes. - Students will describe and compare 2D shapes using multiple attributes and begin to sort them. 	<p>Materials/ Resources:</p> <ul style="list-style-type: none"> - Chart paper - Toothpicks, plasticine, and Shape Cards - Guess Who game boards
Brief lesson activity description	Differentiation plan
<ul style="list-style-type: none"> - Students create 2D shapes with toothpicks/plasticine, identifying # of each needed - Have a class discussion on 2D shapes, relating back to 3D shape knowledge, to introduce 2D attributes. Creating a reference chart of a list of attributes. - Students create 2D shapes with bodies in small groups. - In pairs, students sort their 2D shapes using 1 attribute. Create a list of students' ideas. As a class, sort 2D shapes using 2 attributes in a Venn Diagram. - Play Guess Who: Geometry Edition in pairs. - Provide time to write in Math Journal. 	<p>Provide 2 types of Shape Cards: 1 showing the number of toothpicks and plasticine balls needed and 1 showing only the picture.</p>
<p>Assessment:</p> <ul style="list-style-type: none"> - In their Math Journal, students will identify vertices and edges of a 2D shape they drew and created, and write about what kinds of questions helped them during Geometry Guess Who. - Students will provide a silent 1-4 finger rating on how they feel regarding 2D shapes and their attributes. 	

Lesson #6: Creating 2D Shapes

<p>Key Learning Objectives:</p> <ul style="list-style-type: none"> - Students will construct 2D shapes using various materials and indicate the number of vertices and edges each shape has when applicable. - Students will create large 2D shapes from smaller 2D shapes and find 2D shapes in plants/animals. 	<p>Materials/ Resources:</p> <ul style="list-style-type: none"> - String, popsicle sticks, geoboards, elastics, pattern blocks, Tangram sets and puzzles, water based markers, plant/animal pictures in plastic sheets - Shape Riddle Cards, 2D Shape Cards, forming large 2D Shape Cards
Brief lesson activity description	Differentiation plan
<ul style="list-style-type: none"> - Warm-up activity: small groups work together to create 2D shapes using a single loop of string chosen from options shown on the projector. - In the same groups, students will circulate through stations: <ul style="list-style-type: none"> - Station 1: In pairs, student A describes a shape without saying its name (or reads a Shape Riddle card) and student B guesses the shape by name. - Station 2: Create 2D shapes using geoboards and/or popsicle sticks. - Station 3: Complete Tangram puzzles from a variety of layouts. - Station 4: Using pattern blocks, create large 2D shapes (specific or blank Shape Cards). - Station 5: Find 2D shapes in plants and animals by drawing shapes on pictures inside plastic sheets using markers and stamping it onto paper. - After the stations are complete, students will clean up and write in their journal. 	<ul style="list-style-type: none"> - Cards of varying difficulty. - S#1: Student A may use Shape Riddle Cards and Student B may draw the shape. - S#4: Students can use the cards with the number of each pattern block or use blank ones and fill them out themselves. - S#5: Option to provide students with prompting questions to help identify shapes.

Assessment:

- The teacher will take pictures of students at each station and write down anecdotal observation notes and upload it to FreshGrade for families to see.
- Students will write in their Math Journals about their favourite station and why using the prompt “My favourite station was Station _____ because _____.”
- Students will provide a silent 1-4 finger rating on how comfortable they are constructing 2D shapes.

Lesson #7: Symmetry

Key Learning Objectives:

- Students will be able to create symmetrical shapes by completing the missing half of given shapes.
- Students will be able to identify whether a shape is symmetrical or not.

Materials/ Resources:

- Pictures and objects that are symmetrical
- Symmetry Mats (some with shapes on one half and some blank) and Pattern Blocks
- Cardstock and oil pastels

Brief lesson activity description

- Begin with a discussion about symmetry using symmetrical objects. Prompting questions: *What do you notice about these objects/pictures? What does it mean when something is symmetrical? How can you create a symmetrical image?*
- Get students to create symmetrical shapes using pattern blocks on Symmetry Mats: completing the missing half or creating their own symmetrical shapes.
- As an art activity, fold cardstock in half and draw a pattern/shape on one half of the cardstock using oil pastels. Then refold it and press the cardstock to transfer the pastel to the other side and unfold to reveal the symmetrical drawing.
- Come together as a class and classify shapes as being symmetrical or not.
- Give time for students to write in their Math Journals.

Differentiation plan

- Students can work at their own pace.
- Provide Symmetry Mats of varying difficulty.
- As a challenge, students can use Circle Symmetry Mats with 4 quadrants so they have to add the pattern 3 times.

Assessment:

- The teacher will take pictures of students creating symmetrical shapes and write anecdotal observation notes and then upload it to FreshGrade.
- In their Math Journals, students will draw symmetrical images and asymmetrical images, using a straight line to identify the axis of symmetry when necessary.
- Students will provide a silent 1-4 finger rating on how comfortable they are creating symmetrical shapes.

Lesson #8: Sorting

Key Learning Objectives:

- Students will be able to use a sorting rule to group 2D shapes and 3D objects, using 2 attributes.
- Students will build on their knowledge to identify, describe, and compare different shapes.

Materials/ Resources:

- Class set of mini whiteboards and whiteboard pens
- iPads, 2D shape tiles and 3D wooden objects, Shape Card Deck with attributes, Guess Who game boards, coloured pens and poster paper for Venn Diagrams
- Sorting Passport

Brief lesson activity description

- Begin lesson with Quick Draw Challenges: students quickly view an image and draw it; sharing afterwards what shapes they saw that helped them draw it.

Differentiation plan

- S#2: Student A can use Shape Cards with attributes instead of

<ul style="list-style-type: none"> - As a class, sort 2D shapes and 3D objects using a sorting rule with 2 attributes (ie. flat shapes and curved shapes). - In small groups, students circulate stations - completing their Sorting Passport. <ul style="list-style-type: none"> - Station 1: Groups choose a sorting rule using 2 attributes and make a video explaining their rule and what 2D/3D shapes fit in it and why. - Station 2: In pairs, Student A sorts shapes and/or objects using a sorting rule using 2 attributes (student chosen or from card deck) and student B predicts it. - Station 3: Play Guess Who: Geometry Edition in pairs. - Station 4: Sort shapes and/or objects using a Venn Diagram using 2 attributes (sorting rule chosen by students) as a group. 	<ul style="list-style-type: none"> - coming up with them. - Have a 'sorting attribute word wall' visible for all students.
<p>Assessment:</p> <ul style="list-style-type: none"> - The teacher will take pictures and anecdotal observation notes of students at stations and share on FreshGrade. - Students will hand in their Sorting Passport. 	

Lesson #9: Unit Wrap-Up	
<p>Key Learning Objectives:</p> <ul style="list-style-type: none"> - Students will be able to reflect on their learning throughout the unit by comparing their observations from the 1st lesson to their observations from this lesson. 	<p>Materials/ Resources:</p> <ul style="list-style-type: none"> - Observation Worksheets from beginning of unit - Shape Finders - Blank Observation Worksheets - Clipboards (optional) and writing devices - Talking item found on nature walk (returning after)
Brief lesson activity description	Differentiation plan
<ul style="list-style-type: none"> - Take time to look over observation sheets from the beginning of the unit - Go on a nature walk: <ul style="list-style-type: none"> - Play 'Where is it?' on the walk. - Students complete their Observation Worksheets - focusing on more complex shapes and attributes that they've learned throughout the unit. - Afterwards, sort the shapes that they saw on the walk using 2 attributes. - Wrap up with a sharing circle at the end of the walk, where students pass around the talking item and share something they've learned using the prompt: <i>"I used to think ____, and now I think ____."</i> 	<ul style="list-style-type: none"> - Teacher may provide prompts during nature walk; i.e. <i>How many faces does this rock have? How many vertices can we count on this bench?</i> - Stay on pathways for student mobility needs.
<p>Assessment:</p> <ul style="list-style-type: none"> - Students will hand in their completed Observation Worksheet, including details of attributes and more complex shapes discussed throughout the unit. - Participation in sharing circle - Anecdotal notes/observations taken by teacher. 	

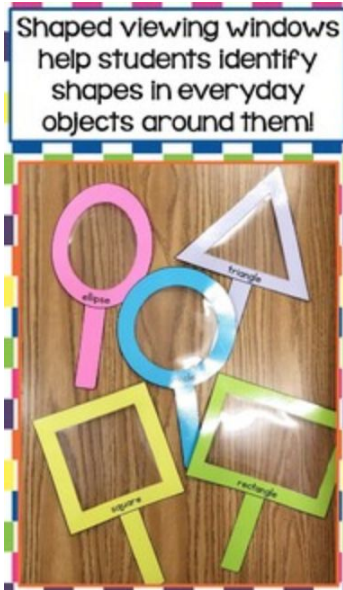
Lesson #1: Shapes in Our Environment

Grade: 2 Lesson 1 of 9 Title: Shapes in Our Environment Materials/Resources: <ul style="list-style-type: none"> - Shape Finders: student created and then laminated before lesson - Individual Observation Worksheets - Clipboards (optional) and writing devices 		Key Learning Objectives: <ul style="list-style-type: none"> - Refresh student's minds on the topic of shapes by exploring shapes in our local environment. - To gain an understanding of students' prior knowledge of shapes and their attributes. 	
		Guiding Questions: <ul style="list-style-type: none"> - What shapes live in objects in our world? - What can you tell me about shapes? 	
Important terms Introduced: Triangle, square, rectangle, circle, oval (ellipse) - various shape names		Prior Knowledge: <ul style="list-style-type: none"> - Grade 1: comparison of 2D shapes and 3D objects through sorting (one attribute), positional descriptions, and replication. 	
First Peoples Principles of Learning: Learning is holistic, reflexive, reflective, experiential and relational (focused on connectedness, on reciprocal relationships, and a sense of place)		Connections to Curriculum: <ul style="list-style-type: none"> - Use reasoning to explore and make connections - Visualize to explore mathematical concepts - Use mathematical vocabulary and language to contribute to mathematical discussions - Science: Make and record observations; Experience and interpret the local environment 	
time	[1] Introduction/warm up	Differentiation	Teaching Points/Key Questions
~10 min	<p>Begin with a read-aloud of 'The Shape of Things' by Dayle Ann Dodds & Julie Lancome.</p> <p>After, have an introductory class discussion on shapes, allowing students to share their prior knowledge as they find and name shapes in the last page of the book. Teacher can then gauge students' previous geometry experience to help guide lessons throughout the rest of the unit.</p>	<p>Allow students to find comfortable spots throughout the classroom where they can listen to the story.</p> <p>To ensure all students have the opportunity to share what they know about geometry, teacher may opt to use popsicle sticks to call on students to participate. Alternatively, a checklist may also be used to ensure you've heard from all students that can be taken on the nature walk to continue checking off names.</p>	<p>On last page of book, project image onto whiteboard and have students go up to circle and name the shapes they see.</p> <ul style="list-style-type: none"> - Can you name and draw any shapes that you can't see in this last page? - What is a shape? - What do you know about shapes? What do you wonder about shapes? - How can you tell what shape something is? - Can you find any shapes in the classroom? Outside? In nature? In animals?
	[2] Activity #1		
~20 min	<p>Take class outside on a nature walk on nearby paths through a natural setting. Get students to use their 'Shape Finders' to point out shapes they can find within natural and</p>	<ul style="list-style-type: none"> - Ensure all students come prepared with proper outerwear prior to this lesson. Write reminder for families in agenda the day before. 	<ul style="list-style-type: none"> - What are some common shapes we know? Can you see those shapes anywhere? - Do you think we can find any shapes hidden in objects we

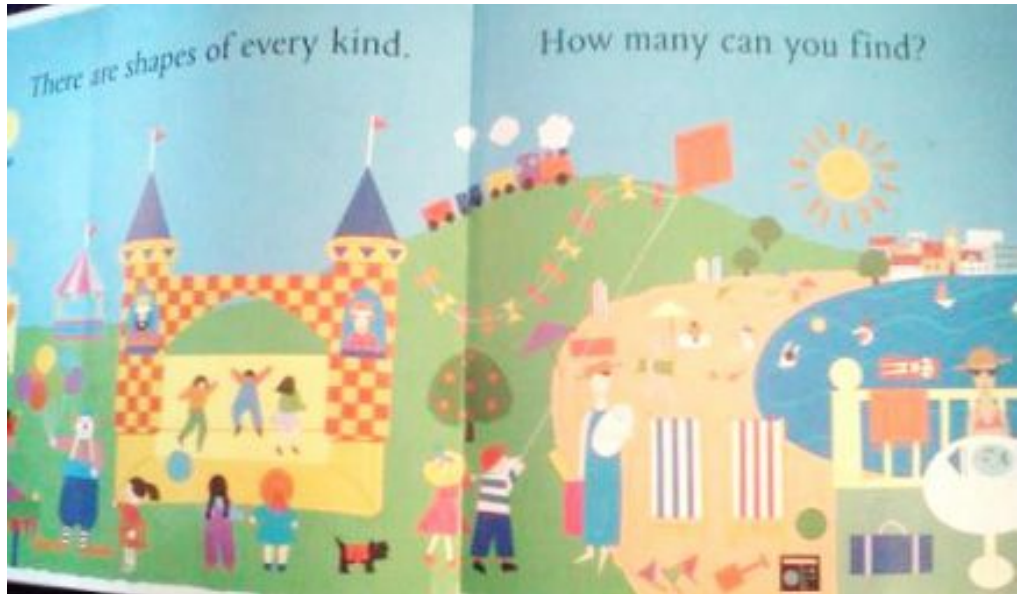
	constructed objects. Teacher should start out by modeling the expectation for all students, and then allow students to move on to finding their own shapes. Students should fill in their Observation Worksheet for at least 3 shapes they were able to find.	<ul style="list-style-type: none"> - If necessary, stay on pathways for any student mobility needs. - Students may choose to write or draw their observations. - They can add more shapes to the back of the page as well. - Bring extra pencils and Observation Worksheets along. 	can see nearby? Look at this rock, what shape can you see? A circle? Or maybe an oval? What about this sign? What shapes can you see in it? (squares, rectangles).
	[4] Wrap up		
~5 min	Gather students in a circle at the end of the walk. Get the students to choose an item to be used as a 'talking item'. Given the prompt: "A shape I saw today was _____", have students pass the talking item around the circle to their right and share one of their shapes and what object they found it in. Afterwards, return the 'talking item' to its home in nature.	May prompt students for specific shapes if necessary; i.e. " <i>Can you tell us where you saw that triangle? Remember that yellow leaf you found?</i> "	This activity provides a good opportunity to share with students the traditional practice of the W̱SÁNEĆ peoples. Explain the reasons it's important that we leave the lands better than we've found them, and take this sharing circle opportunity to thank the local Nations (W̱SÁNEĆ, Songhees, and Esquimalt) for allowing us all to live and learn from one another on their lands.
<p>Assessment:</p> <ul style="list-style-type: none"> - Students will participate in discussions about shapes and their attributes using informal language. - The teacher will make anecdotal notes and observations regarding students' participation in discussions. - Students will hand in their Observation Worksheets at the end of the lesson. Observation expectation requires at least 3 shapes to be documented in written or drawn format. 			
<p>Future Knowledge:</p> <ul style="list-style-type: none"> - This unit: This lesson prepares students to begin talking about 2D shapes and using their names in preparation for adding positional language in the next lesson. It also gets students thinking about different types of shapes and where they can be found, which will help them find similarities and differences in later lessons. Finding shapes in their local environment will also prepare students to find and draw shapes in plants and animals. - Grade 3: This will help prepare students to identify and compare 3D objects using specific math language based on their 2D shape faces. 			

Appendix for Lesson #1: Shapes in Our Environment


Shape Finders:



Last page of 'The Shape of Things' book:



Observation Worksheet:

Nature Walk Shapes 		Name:
I found this shape:	In this object:	
I found this shape:	In this object:	
I found this shape:	In this object:	
I found this shape:	In this object:	

Lesson #5: 2D Shapes & Their Attributes

<p>Grade: 2 Lesson: 5 of 9 Title: 2D Shapes and Their Attributes</p> <p>Materials/Resources:</p> <ul style="list-style-type: none"> - Chart paper - Toothpicks, plasticine, and Shape Cards - Guess Who game boards - Math Journals 		<p>Key Learning Objectives:</p> <ul style="list-style-type: none"> - Students will use their knowledge of 3D objects and apply it to 2D shapes. - Students will describe and compare 2D shapes using multiple attributes and begin to sort them. 	
<p>Important terms introduced: Straight and curved edges (or sides), vertices (or points), sorting rule, attributes</p>		<p>Guiding Questions:</p> <ul style="list-style-type: none"> - How are 2D objects similar to 3D objects? - How can we describe, compare, and sort 2D shapes? <p>Prior Knowledge: Students will use their 3D shape knowledge learned in previous lessons to see similarities and differences in 2D shapes. Students also know how to sort shapes using one attribute from grade 1.</p>	
<p>First Peoples Principles of Learning:</p> <ul style="list-style-type: none"> - Learning is holistic, reflexive, reflective, experiential and relational (focused on connectedness, on reciprocal relationships, and a sense of place) - Learning involves time and patience 		<p>Connections to Curriculum:</p> <ul style="list-style-type: none"> - Use reasoning to explore and make connections - Develop, demonstrate, and apply mathematics understanding through play, inquiry, and problem solving - Visualize to explore mathematical concepts - Use mathematical vocabulary and language to contribute to mathematical discussions - Represent mathematical ideas in concrete, pictorial, and symbolic forms - Reflect on mathematical thinking - Science: Identify simple patterns and connections; Transfer and apply learning to new situations 	
time	[1] Introduction/warm up	Differentiation	Teaching Points/Key Questions
~10 min	<p>Students will create 2D shapes using toothpicks and plasticine balls and write down how many of each they need to create each shape.</p> <p>Afterwards, have a class discussion relating back to knowledge on 3D objects and introduce 2D attributes</p> <ul style="list-style-type: none"> - look at similarities and differences and relate to previous activity. Create a list of different attributes on chart paper to leave up in class. Get students describing/ comparing 2D shapes. 	<p>During the exploration activity, students can use Shape Cards to help them create 2D shapes if they choose. Provide 2 types:</p> <ul style="list-style-type: none"> - Shows only the picture and students write how many toothpicks and plasticine balls are needed. - Shows the picture and number of toothpicks and plasticine balls needed. <p>Larger materials can be available as needed. Shapes students create will be used throughout the lesson.</p>	<ul style="list-style-type: none"> - Can you make the same shape but smaller? Bigger? - What other shapes can you make that aren't already on a Shape Card? - What did the toothpicks and plasticine balls represent in the exploration activity? - How are 2D shapes and 3D objects the same? Different? - How are 2D shapes the same/ different from each other? - How can you describe the 2D shapes that you made? - Name some attributes that describe 2D shapes.

	[2] Activity #1		
~5 min	Students create 2D shapes using their bodies in small groups, relating it back to the previous discussion.	Students can use their hands to make shapes if using their whole body is challenging.	<ul style="list-style-type: none"> - How many vertices does the shape you're making have? - How many edges does the shape you're making have?
	[3] Activity #2		
~8 min	In pairs, students sort their 2D shapes from the exploration activity using 1 attribute. Create a list of students' ideas. Then as a class, students sort their 2D shapes from the exploration activity in a Venn Diagram format using two attributes.	As students get comfortable with sorting using a Venn Diagram format, they can start working alone or in pairs, while the rest of the class continues to sort shapes together with teacher guidance.	<ul style="list-style-type: none"> - Look at what is the same and what is different. - What are some ways that we can group/sort these shapes? - How have you sorted your 2D shapes? - Does this shape have attribute A, attribute B, both, or none?
	[4] Activity #3		
~7 min	<p>Play Guess Who: Geometry Edition in pairs to practice describing 2D shapes - switching pairs between rounds if students want.</p> <p>Choose appropriate playing cards from the appendix below.</p>	<ul style="list-style-type: none"> - This game is not a competition and should be played as an open game aimed to practice describing 2D shapes based on attributes. - Students may use the reference chart of shape attributes just created 	<ul style="list-style-type: none"> - What do you notice about the language you use to describe 2D shapes? - What kind of questions will help you narrow down your partner's secret shape? - Use shape attributes to help you.
	[5] Wrap up		
~5 min	Time to write in Math Journal: draw 2D shapes that they created and identify their attributes, and write questions that helped them during Geometry Guess Who. Take a silent 1-4 finger rating.	<ul style="list-style-type: none"> - Instead of writing students can draw in their journal or explain what they learned orally to the teacher. 	<ul style="list-style-type: none"> - What kind of questions helped you most to narrow down your partner's secret shape?

Assessment:

- In their Math Journal, students will identify vertices and edges of a 2D shape they drew and created, and write about what kinds of questions helped them during Geometry Guess Who.
- Students will provide a silent 1-4 finger rating on how they feel regarding 2D shapes and their attributes.

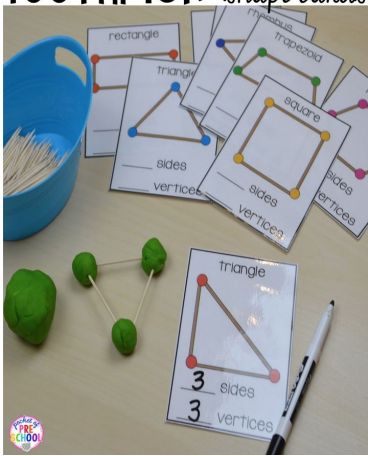
Future Knowledge:

- This unit: At the end of this lesson, students will be ready to construct 2D shapes in various ways as well as begin naming 2D shapes based on a list of attributes, which they will explore in the next class. Some students will also be ready to sort 2D shapes on their own or in small groups using 2 attributes.
- Grade 3: This will help prepare students to better understand 3D objects by further looking at the relationship between 2D shapes and 3D objects in order to understand the preservation of shape and identify 3D objects by their net skeletons.

Appendix for Lesson #5: 2D Shapes & Their Attributes

Exploration activity:

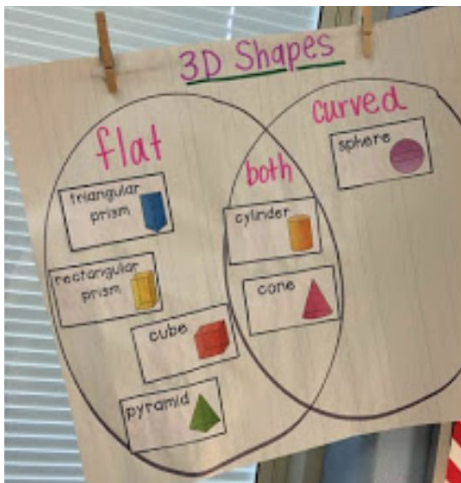
TOOTHpICK shape cards



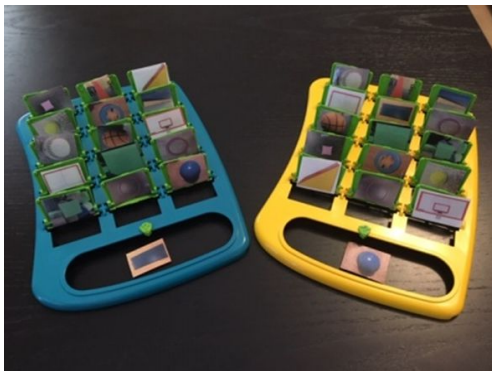
Example 2D Shape attribute chart:

SHAPE	SIDES	VERTICES	LOOKS LIKE
circle	0	0	clock, pizza
oval	0	0	egg, egg
triangle	3	3	sign, flag
square	4	4	fridge, square
rectangle	4	4	flag, ruler
parallelogram	4	4	roof, sign
rhombus	4	4	kite, diamond
trapezoid	4	4	base, roof
pentagon	5	5	house, sign
hexagon	6	6	honeycomb, sign
octagon	8	8	stop sign, sign

Example sorting using 2 attributes on a Venn Diagram:

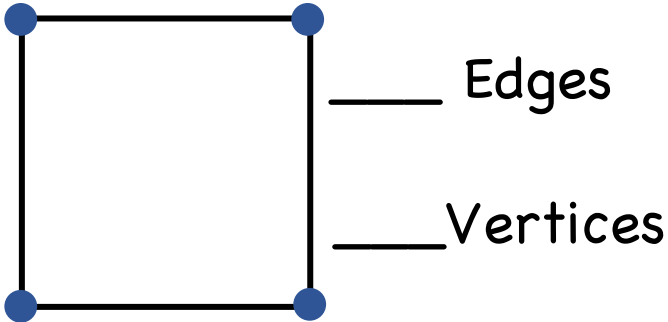


Other examples of Guess Who boards:

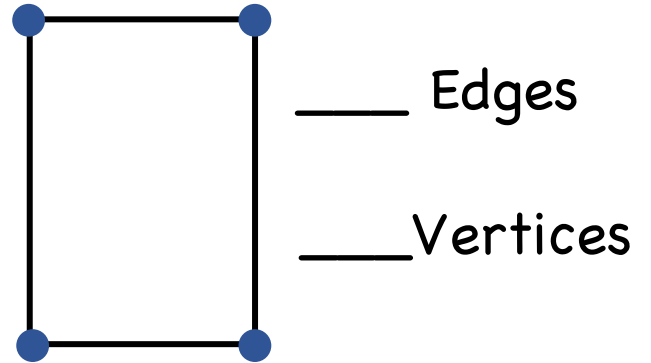


2D Shape Cards: Toothpicks and Plasticine Balls (no answers)

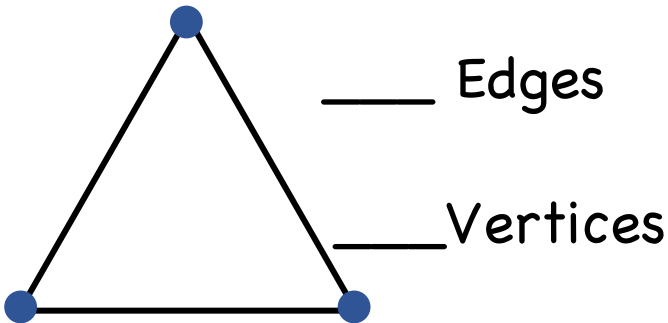
Square



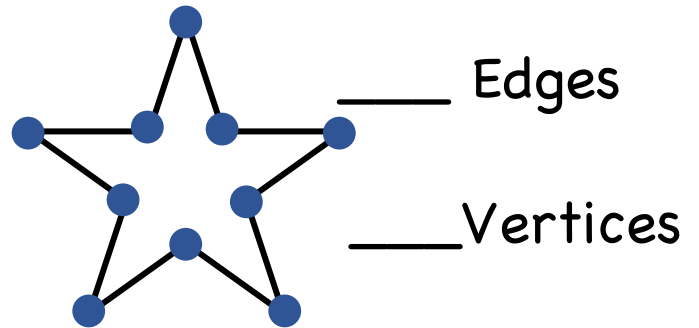
Rectangle



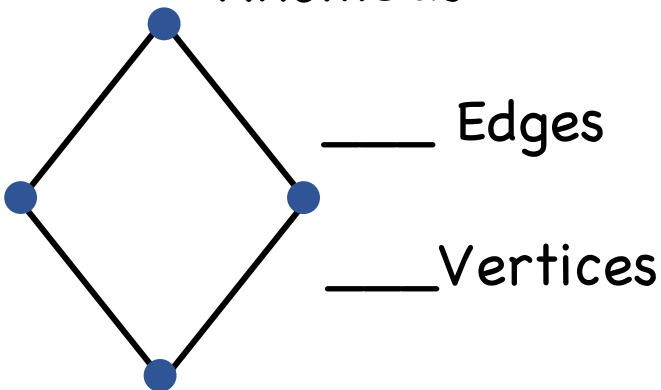
Triangle



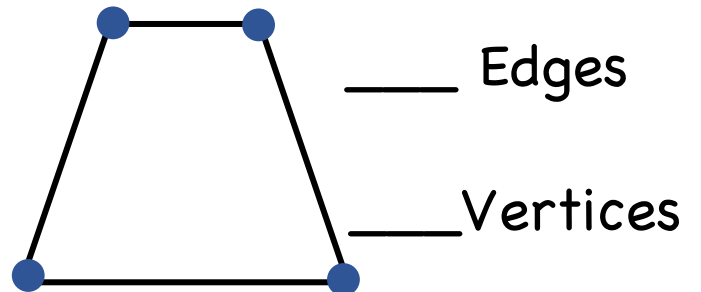
Star



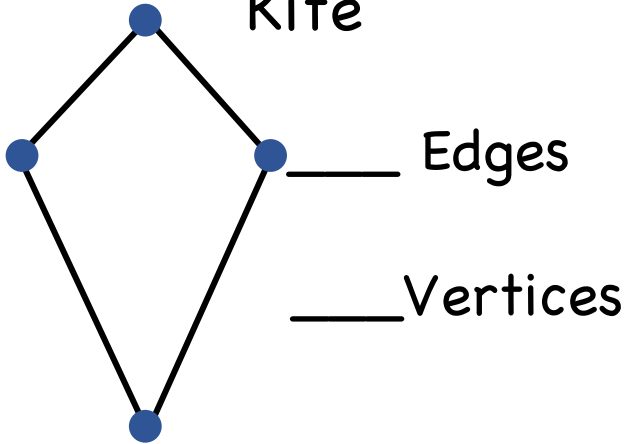
Rhombus



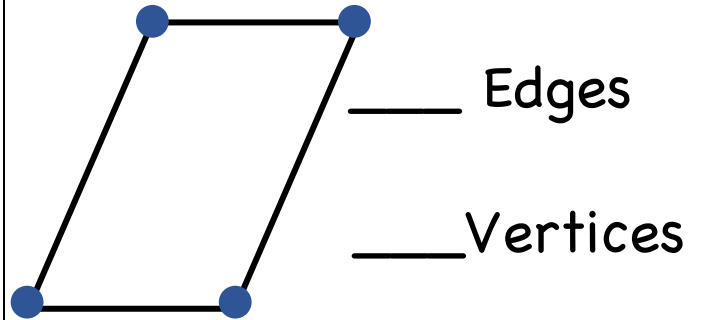
Trapezoid



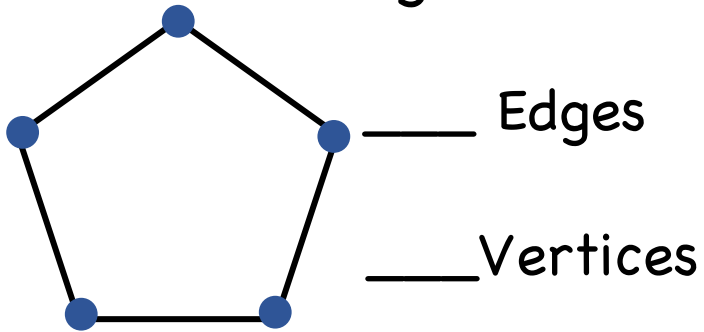
Kite



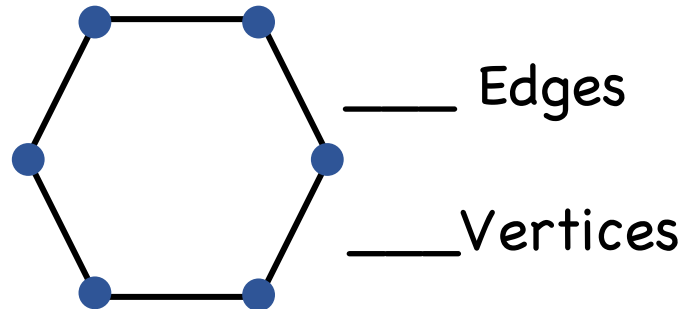
Parallelogram



Pentagon

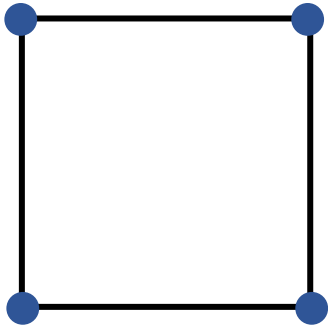


Hexagon



2D Shape Cards: Toothpicks and Plasticine Balls (with answers)

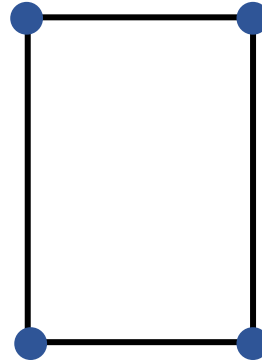
Square



4 Edges

4 Vertices

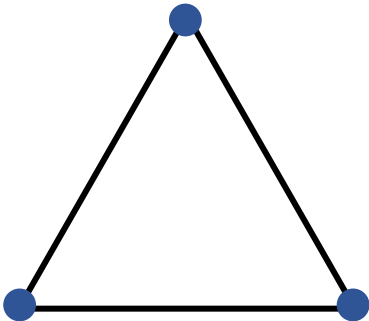
Rectangle



4 Edges

4 Vertices

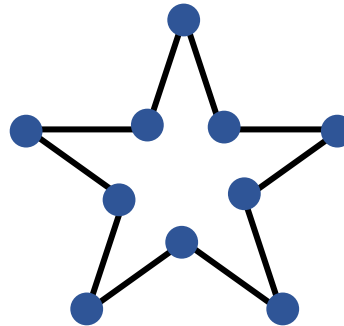
Triangle



3 Edges

3 Vertices

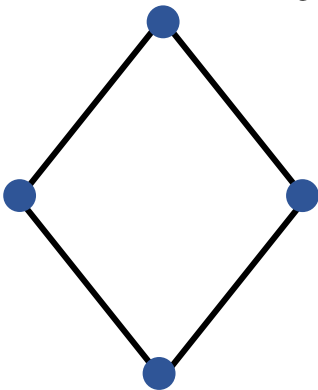
Star



10 Edges

10 Vertices

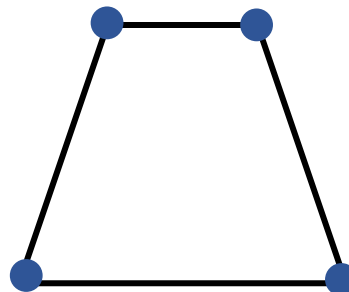
Rhombus



4 Edges

4 Vertices

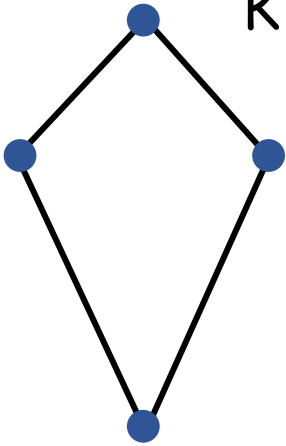
Trapezoid



4 Edges

4 Vertices

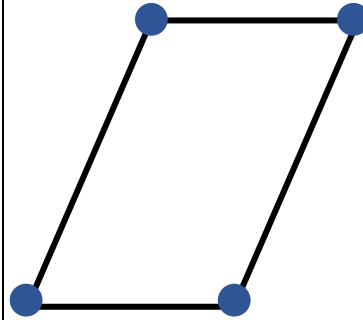
Kite



4 Edges

4 Vertices

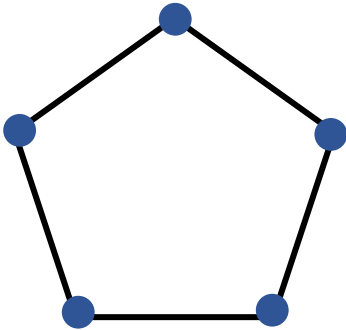
Parallelogram



4 Edges

4 Vertices

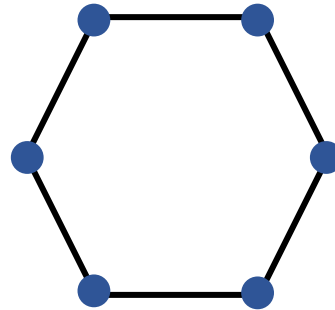
Pentagon



5 Edges

5 Vertices

Hexagon

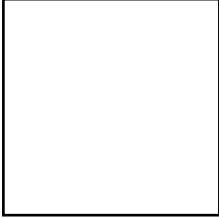
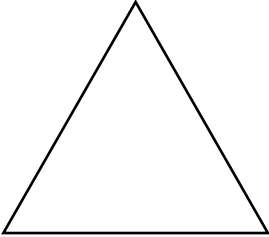
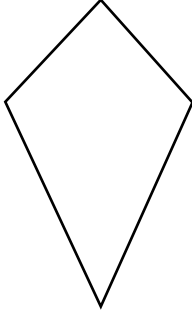

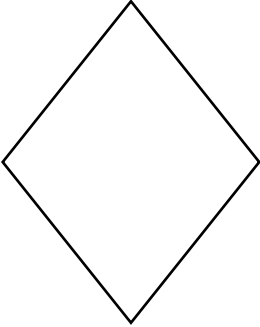
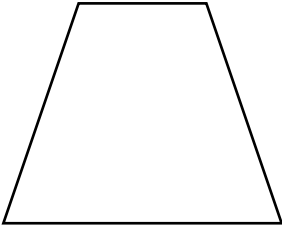
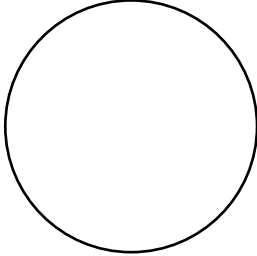
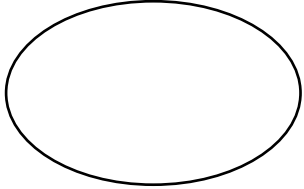
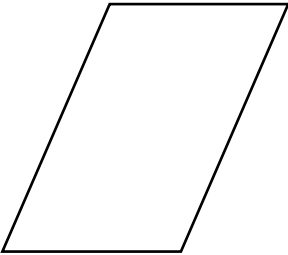
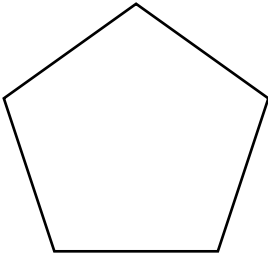
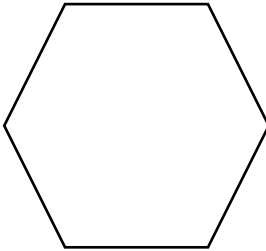
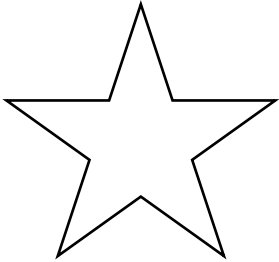


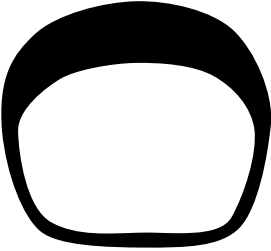
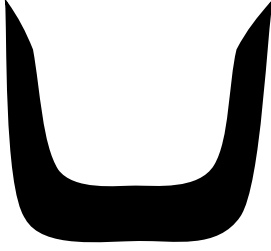
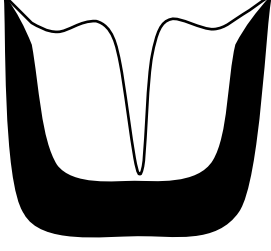
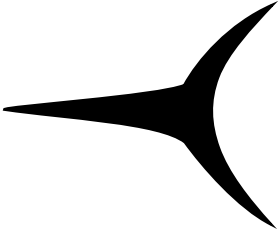
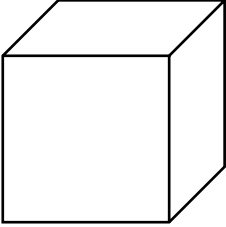
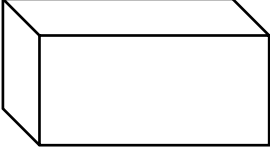
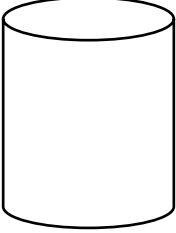
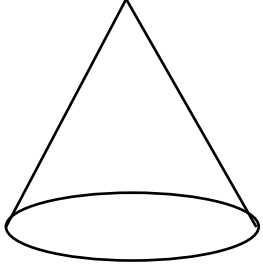
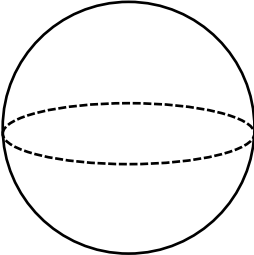
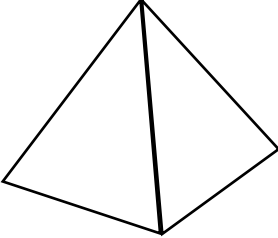
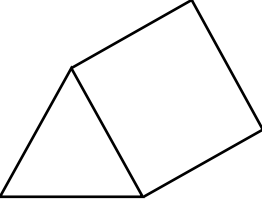
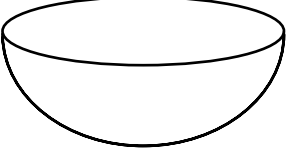
6 Edges

6 Vertices

Guess Who: Geometry Edition Cards

- The cards used can be chosen from below based on topic (2D shapes or 2D shapes and 3D objects). Each game will need 3 of each card used.

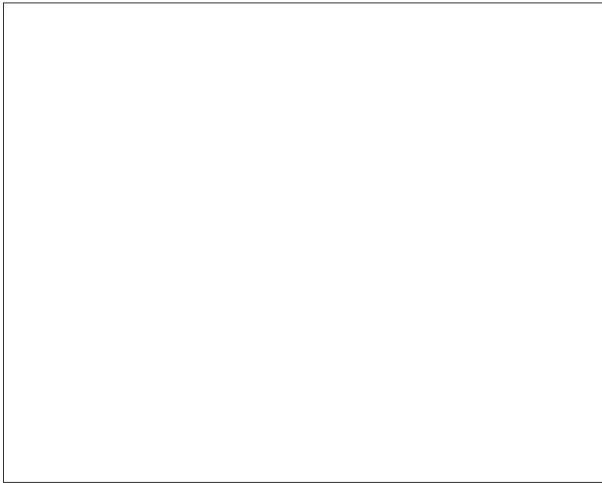
Square 	Triangle 	Kite 	Rectangle 
Rhombus 	Trapezoid 	Circle 	Oval (ellipse) 
Parallelogram 	Pentagon 	Hexagon 	Star 

<p>Ovoids</p> 	<p>U</p> 	<p>Split U</p> 	<p>Trigons</p> 
<p>Cube</p> 	<p>Rectangular Prism</p> 	<p>Cylinder</p> 	<p>Cone</p> 
<p>Sphere</p> 	<p>Pyramid</p> 	<p>Triangular Prism</p> 	<p>Hemisphere</p> 

Sample journal entry layouts:

Sample journal layout – page 1

A 2D shape I created today:



This shape has _____ edges.

This shape has _____ vertices.

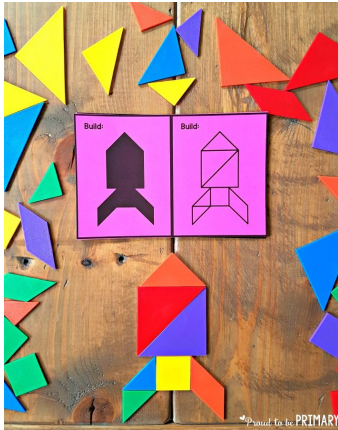
Page 2

The yes/no questions that helped me in Guess Who were:

****Don't forget to check our geometry word wall for help with spelling math words!****

Appendix for Learning Plan:

Lesson 2: Shape Exploration & Spatial Awareness



Where Is It?

Dear Parent/Guardian:

Our class has been learning to describe the location of objects in the classroom and around the school using such words as:

beside on top of over near
 in front of behind
 to the left of under to the right of

Here is a game you can play at home, in the car, at the grocery store, or in the park.

Choose an object, but don't tell your child what it is. Have your child identify the secret object by asking questions. You may answer only "yes" or "no" to the questions. For example, your child might ask:

- "Is it on the table?"
- "Is it beside the salt?"
- "Is it under the slide?"
- "Is it near the steering wheel?"

Asking questions like these gives children opportunities to practise language that helps them describe where things are located.

Have fun playing the game!

Lesson 3: 3D Shapes & Their Attributes

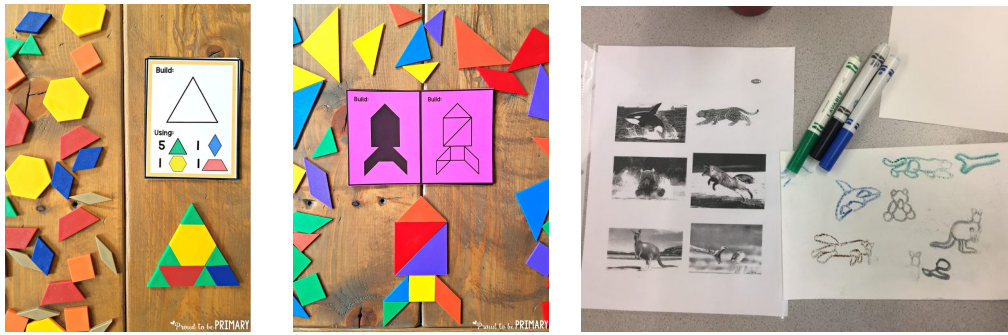


3-D SHAPES	EDGES	VERTICES	FACES	LOOKS LIKE
Cone	0	1	1	Ice cream cone
Cylinder	0	0	2	Can, Soda, Disk
Pyramid	5	8	5	Pyramid, Egg
Rectangular prism	12	8	6	Box of cereal, Phone
Cube	12	8	6	Wood block
Sphere	0	0	0	Marble
Tetrahedral pyramid	9	6	5	Die, Paper airplane

Lesson 4: Creating 3D Shapes - Guest Speaker



Lesson 6: Creating 2D Shapes

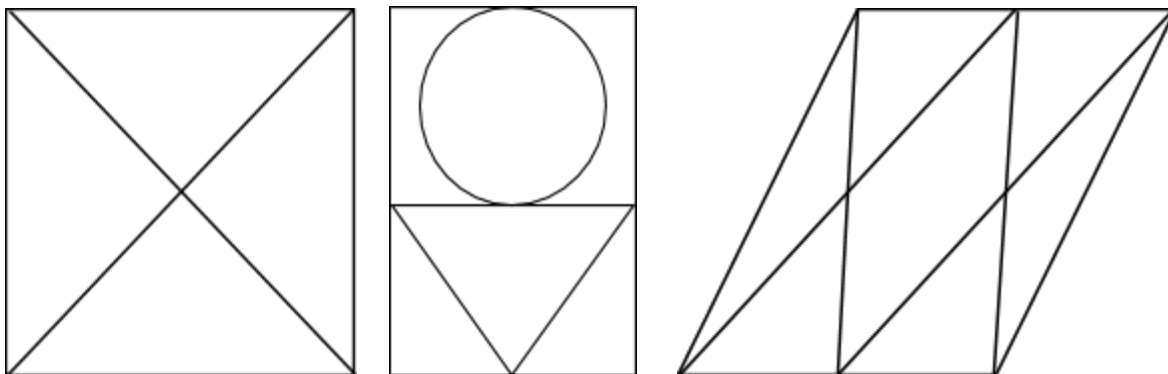


Lesson 7: Symmetry



Lesson 8: Sorting

Quick Draw Challenge Examples:



Lesson 9: Unit Wrap-Up

See Lesson 1 Appendix above

References

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