SOUTH CAROLINA SUPPORT SYSTEMS INSTRUCTIONAL GUIDE	
Content Area	**First Grade Mathematics**
Recommended Days of Instruction	**Third Nine Weeks**

Standards/Indicators Addressed:

Standard 1-2: The student will demonstrate through the mathematical processes a sense of quantity and numeral relationships; the relationships among addition, subtraction, and related basic facts; and the connections among numeric, oral, and written-word forms of whole numbers.

1-2.8 Generate strategies to add and subtract without regrouping through two-digit numbers. (B2)
1-2.9 Analyze the magnitude of digits through 999 on the basis of their place value. (B4)- yearlong

Standard 1-4: The student will demonstrate through the mathematical processes a sense of two- and three-dimensional geometric shapes, symmetry, and relative positions and directions in space.

1-4.1 Identify the three-dimensional geometric shapes prism, pyramid, and cone. (A1)
1-4.2 Analyze the two-dimensional shapes circle, square, triangle, and rectangle. (B4)
1-4.3 Classify two-dimensional shapes as polygons or nonpolygons. (A2)
1-4.4 Identify a line of symmetry. (B1)
1-4.5 Use the positional and directional terms *north, south, east,* and *west* to describe location and movement. (A3)

Standard 1-5: The student will demonstrate through the mathematical processes a sense of the value of combinations of coins and the measurement of length, weight, time, and temperature.
1-5.8 Use analog and digital clocks to tell and record time to the half hour. (C3) yearlong
1-5.9 Illustrate past and future dates on a calendar. (A2) yearlong
1-5.10 Represent dates in standard form (June 1, 2007, for example) and numeric form (6-1-2007, for example). (A2) yearlong
1-5.11 Use Celsius and Fahrenheit thermometers to measure temperature. (C3) yearlong

* These indicators are covered in the following 3 Modules for this Nine Weeks Period.
Teaching time should be adjusted to allow for sufficient learning experiences in each of the modules.

Module 3-1 Year Long Indicators			
Indicator	**Recommended Resources**	**Suggested Instructional Strategies**	**Assessment Guidelines**
1-2.9 Analyze the magnitude of digits through 999 on the basis of their place value. (B4)- 1-5.8 Use analog and digital clocks to tell and record time to the half hour. (C3) 1-5.9 Illustrate past and future dates on a calendar. (A2) 1-5.10 Represent dates in standard form (June 1, 2007, for example) and numeric form (6-1-2007, for example). (A2) 1-5.11 Use Celsius and Fahrenheit thermometers to measure temperature. (C3)	NCTM's Online Illuminations http://illuminations.nctm.org/ NCTM's Navigations Series SC Mathematics Support Document Teaching Student-Centered Mathematics Grades K-3 and Teaching Elementary and Middle School Mathematics Developmentally 6th Edition, John Van de Walle NCTM's Principals and Standards for School Mathematics (PSSM) Hands On Standards Grade PreK-K and 1-2, Learning Resources		

Module 3-2 Operations: Addition and Subtraction			
Indicator	**Recommended Resources**	**Suggested Instructional Strategies**	**Assessment Guidelines**

Module 3-2 Lesson A Generating Strategies 1-2.8 Generate strategies to add and subtract without regrouping through two digit numbers (B2)	NCTM's Online Illuminations http://illuminations.nctm.org/ NCTM's Navigations Series SC Mathematics Support Document Teaching Student-Centered Mathematics Grades K-3 and Teaching Elementary and Middle School Mathematics Developmentally 6th Edition, John Van de Walle NCTM's Principals and Standards for School Mathematics (PSSM) Hands On Standards Grade PreK-K and 1-2, Learning Resources	See Instructional Planning Guide Module 3-2 Introductory Lesson A See Instructional Planning Guide Module 3-2, Lesson A Additional Instructional Strategies	See Instructional Planning Guide Module 3-2 Lesson A Assessment
Module 3-3 Dimensionality/Plane and Spatial Reasoning			
Indicator	**Recommended Resources**	**Suggested Instructional Strategies**	**Assessment Guidelines**
Module 3-3 Lesson A Three-Dimensional Shapes 1-4.1 Identify the three dimensional geometric shapes, prism, pyramid, and cone. (A1)	NCTM's Online Illuminations http://illuminations.nctm.org/ NCTM's Navigations Series SC Mathematics Support Document Teaching Student-Centered Mathematics Grades K-3 and Teaching Elementary and Middle School Mathematics Developmentally 6th Edition, John	See Instructional Planning Guide Module 3-3 Introductory Lesson A See Instructional Planning Guide Module 3-2, Lesson A Additional Instructional Strategies	See Instructional Planning Guide Module 3-3 Lesson A Assessment

Module 3-3 Lesson B Two-Dimensional Shapes 1-4.2 Analyze the two-Dimensional shapes circle, square, triangle, and rectangle. (B4)	Van de Walle NCTM's Principals and Standards for School Mathematics (PSSM) Hands On Standards Grade PreK-K and 1-2, Learning Resources	See Instructional Planning Guide Module 3-3 Introductory Lesson B See Instructional Planning Guide Module 3-2, Lesson B Additional Instructional Strategies	See Instructional Planning Guide Module 3-3 Lesson B Assessment
Module 3-3 Lesson C Polygons and Nonpolygons 1-4.2 Classify two-dimensional shapes as polygons and nonpolygons (A2)	NCTM's Online Illuminations http://illuminations.nctm.org/ NCTM's Navigations Series SC Mathematics Support Document	See Instructional Planning Guide Module 3-3 Introductory Lesson C See Instructional Planning Guide Module 3-2, Lesson C Additional Instructional Strategies	See Instructional Planning Guide Module 3-3 Lesson C Assessment
Module 3-3 Lesson D Line of Symmetry 1-4.4 Identify a line of symmetry (B1)	Teaching Student-Centered Mathematics Grades K-3 and Teaching Elementary and Middle School Mathematics Developmentally 6th Edition, John Van de Walle	See Instructional Planning Guide Module 3-3 Introductory Lesson D See Instructional Planning Guide Module 3-3, Lesson D Additional Instructional Strategies	See Instructional Planning Guide Module 3-2 Lesson D Assessment

Module 3-3 Lesson E Using Positional and Directional Terms 1-4.5 Use the positional and directional terms, north, south, east, and west to describe location and movement. (A3)	NCTM's Principals and Standards for School Mathematics (PSSM) Hands On Standards Grade PreK-K and 1-2, Learning Resources	See Instructional Planning Guide Module 3-3 Introductory Lesson E See Instructional Planning Guide Module 3-3, Lesson E Additional Instructional Strategies	See Instructional Planning Guide Module 3-2 Lesson E Assessment

MODULE

3-1

Year Long Indicators

This module addresses the following indicators:

1-2.9 Analyze the magnitude of digits through 999 on the basis of their place value. (B4)
1-5.8 Use analog and digital clocks to tell and record time to the half hour. (C3)
1-5.9 Illustrate past and future dates on a calendar. (A2)
1-5.10 Represent dates in standard form (June 1, 2008, for example) and numeric form (6-1-2008, for example). (A2)
1-5.11 Use Celsius and Fahrenheit thermometers to measure temperature. (C3)

This module contains 4 lessons. These indicators were first introduced in First Nine Weeks. These lessons are **INTRODUCTORY ONLY.** Lessons in S³ begin to build the conceptual foundation students need. **ADDITIONAL LESSONS will be required** to fully develop the concepts.

I. Planning the Module

The first bullet under the Continuum of Knowledge represents students prior knowledge and/or skills related to this standard. It is recommended that students are pre-assessed on this prior knowledge.

- **Continuum of Knowledge**

1-2.9 Analyze the magnitude of digits through 999 on the basis of their place value.

- In kindergarten, students analyzed the magnitude of digits through 99 on the basis of their place value (K-2.6) and represented the place value of each digit in a two-digit whole number (K-2.7)
- In first grade, students analyze the magnitude of digits through 999 on the basis of their place value (1-2.9).
- In second grade, students will analyze the magnitude of digits through 9,999 on the basis of their place value.

1-5.8 Use analog and digital clocks to tell and record time to the half hour. (C3)

- In kindergarten, students use analog and digital clocks to tell time to the hour. (K-5.6)
- In first grade, students use analog and digital clocks to tell and record time to the half hour. (1-5.8)
- In second grade, students use analog and digital clocks to tell and record time to the nearest quarter hour and to the nearest five-minute interval. (2-5.7)

1-5.9 Illustrate past and future dates on a calendar. (A2)

- In kindergarten, students use a calendar to identify dates, days of the week, and months of the year (K-5.7).
- In first grade, students illustrate past and future dates on a calendar (1-5.9).

1-5.10 Represent dates in standard form (June 1, 2008, for example) and numeric form (6-1-2008, for example). (A2)

- In kindergarten, students use a calendar to identify dates, days of the week, and months of the year (K-5.7).
- In first grade, represent dates in standard form (June 1, 2007, for example) and numeric form (6-1-2007, for example) (1-5.10).

1-5.11 Use Celsius and Fahrenheit thermometers to measure temperature.

- In kindergarten, students identify digital and standard thermometers as devices used to measure temperature (K-5.4). Students understand which measure-length, weight, time, or temperature-is appropriate for a given situation (K-5.5).
- In first grade, students use Celsius and Fahrenheit thermometers to measure temperature (1-5.11).
- In second grade, students use appropriate tools to measure temperature on Celsius and Fahrenheit thermometers (2-5.3).

- **Key Concepts/ Key Terms**

  *These are vocabulary terms that are reasonable for students to know and be able to use. Terms without the * are additional terms for teacher awareness, knowledge and use in conversation with students.

*Analog
*Digital
*Hour
Half hour
*Calendar
*Date
*Days of the week
*Months of the year
*Past
*Present
*Future
*Celsius
*Fahrenheit
*Thermometer
*Temperature
*Degrees
*Scale
*Measure
*Magnitude
*Place value

II. Teaching the Lesson(s)

Teacher Notes: Mathematics learning builds over the course of time. This is especially true with concepts such as number sense and measurement. As a result some topics are best acquired through repeated exposure in small on-going intervals of time. Therefore, while an introductory lesson has been provided for the concepts addressed in Module 1-1, First Nine Weeks, it is important to point out that students will need on-going formal and informal experiences throughout the year to ensure the automaticity and flexibility that is demonstrated with mathematical understanding.

First grade students should continue to use concrete and pictorial materials to build understanding on the concepts addressed in First Nine Weeks in Module 1-4 as well as Second Nine Weeks in Module 2-1 for these year-long indicators. Please refer to these modules and provide learning experiences that builds on prior learning to meet the indicators.

MODULE

3-2

Operations – Addition and Subtraction

This module addresses the following indicators:

1-2.8 Generate strategies to add and subtract without regrouping through two-digit numbers. (B2)

This module contains 1 lesson. These lessons are **INTRODUCTORY ONLY**. Lessons in S3 begin to build the conceptual foundation students need. **ADDITIONAL LESSONS will be required** to fully develop the concepts.

I. Planning the Module

The first bullet under the Continuum of Knowledge represents students prior knowledge and/or skills related to this standard. It is recommended that students are pre-assessed on this prior knowledge.

- **Continuum of Knowledge**

  1-2.8 Generate strategies to add and subtract without regrouping through two-digit numbers. (B2)

  - In kindergarten, students represented simple joining and separating situation through 10 (K-2.4) and developed an understanding that addition results in increase and subtraction results in decrease (K-2.5)
  - In first grade, students generate strategies to add and subtract without regrouping through two-digits numbers (1-2.8) and recall basic addition facts through 9 + 9 (1-2.6) and summarize the inverse relationship between addition and subtraction (1-2.7).
  - In second grade, students will generate strategies to add and subtract pairs of two digit whole numbers with regrouping (2-2.7) and they generate addition and subtraction strategies to find missing addends and subtrahends in number combination through 20 (2-2.8)

- **Key Concepts/Key Terms**

  *These are vocabulary terms that are reasonable for students to know and be able to use. Terms without the * are additional terms for teacher awareness, knowledge and use in conversation with students.

  ***addition**
  ***subtraction**
  ***basic facts**
  ***generate strategies**

II. Teaching the Lesson(s)

1. Teaching Lesson 3-2A: Generating Strategies

1-2.8 Generate strategies to add and subtract without regrouping through two-digit numbers. (B2)

For this indicator, it is **essential** for students to:
- recall basic addition and subtraction facts
- explain their reasoning for solution strategies
- generate strategies using concrete materials

For this indicator, it is **not essential** for students to:

- solve 2-digit addition and subtraction problems without the use of concrete or pictorial models
- solve problems that require regrouping
- gain computational fluency

d. Indicators with Taxonomy

Indicator → 1-2.8 Generate strategies to add and subtract without regrouping through two-digit numbers. (B2)
Cognitive Process Dimension: Understand
Knowledge Dimension: Conceptual Knowledge

e. Introductory Lesson

Materials Needed:

- *Paper and Pencil for drawings*
- *Chart Paper and Markers*
- *Base Ten Blocks*
- *Cusinaire Rods*
- *Cubes*
- *Number Line*
- *Number Grid/ 100 Chart*

Teacher Note:

It is essential that a strong connection be made between these indicators and the related Algebra standard indicators 1-3.1,1-3.2, 1-3.3 and 1-3.4 that deal with patterns and the relationships between/among numbers.

The goal for first grade students with regard to addition and subtraction is that they recall basic facts written symbolically, summarize the inverse relationship between addition and subtraction, and use their kindergarten knowledge of combining and separating sets to generate THEIR OWN strategies to add and subtract through two-digit numbers without regrouping.

Connections To Other First Grade Indicators:

1-3.1 Analyze numeric patterns in addition and subtraction to develop strategies for acquiring basic facts.

1-3.2 Translate patterns into rules for simple addition and subtraction.
1-3.3 Illustrate the commutative property based on basic facts.
1-3.4 Analyze numeric relationships to complete and extend simple patterns.

Since the connection between these "pattern/relationships" indicators and the above addition and subtraction indicators are obvious, no further explanation will be provided.

Research has proven that students will invent a variety of strategies for addition and subtraction. It is important that students have at least one or two strategies that are effective and mathematically correct and helpful with many numbers. Children will create strategies based on what makes sense for them; however students will learn traditional algorithms from an outside source. Please encourage students to use other strategies to subtract/ add. Allow children to have the freedom to invent strategies and explain their reasoning. Record different strategies, daily, in order to help students who need short term memory assistance. (Van de Walle, 2006)

During the Lesson: *For this lesson, students will invent strategies for solving addition and subtraction problems that are embedded in story problems. Begin the lesson by asking the students what it means to invent things? Tell them that today they are going to invent many ways to solve the same problem. Pose this simple problem:* ***"Kris saved 33 cents when Dad gave her some money for doing chores. Now Kris has 55 cents. How much did Kris earn for doing chores?"*** Instruct the children to solve this problem using a variety of materials (manipulates such as base ten blocks, cubes, number line, number grid, Cuisenaire Rods, unifix cubes) Give the students a "hint" if necessary but don't give too much instruction. Allow the children ample time to solve this problem in partners or groups. Walk around the room and observe the students and ask them to explain their reasoning. After the children have created their strategies, ask, "Who would like to share their strategy for solving this problem?" Instruct the children to come up to the board or chart stand and explain their strategy for solving the problem; this is the most important part of the lesson. For example, "What might be a reason why you chose this strategy? Will you explain your thinking?" Encourage students to ask questions of their peers and allow the students the opportunity to solve a couple of the students' methods. Record the students' strategies on chart paper. Now, pose this problem, **"Sarah was on page 47 of his book. Then she read 21 more pages. How many pages did Tommy read in all?"** Instruct the children to solve this problem using at least two different strategies. The most important component of this lesson is for children to generate strategies; these activities will provide a basis for mental computation and estimation. As instructed in the beginning of the lesson, instruct the students to share their strategies with the class. Be sure to ask the children to explain their reasoning. Wrap of the lesson

by asking, "Which of these strategies that you have seen or created do you want to use in the future and why?" As you think about today's lesson on generating/inventing strategies; are there some problems that you would have solved differently? How can you apply these strategies learned today in your life?"

c. Misconceptions/Common Errors

No misconceptions are noted at this time.

d. Additional Instructional Strategies/Differentiation:

- Since the focus is for students to generate their own strategies, instructional strategies should guide students through this process. Sample questions that guide student processing and reasoning may be
- How are these problems like other addition problems we have done? How are they different? *Students may say that the problems have an addition sign and numbers but they have two digits instead of one digit.*
- How are these problems like other subtraction problems we have done? How are they different?
- How could we do these problems like we did the problems with one digit?
- Given a story problem: How could we represent this problem using manipulatives? Explain to me how you are arranging your manipulatives to find your answer.
- An additional focus of the indicator is for students to build a conceptual understanding of addition and subtraction through the use of concrete models. Building this conceptual knowledge will make it easier for students to work with traditional algorithms later.

Listed below are some examples of possible strategies that the children may create. (These strategies are from Teacher Student-Centered Mathematics Grades K-3 by John a. Van de Walle and LouAnn H. Lovin, 2006, Pages 166-176)

Invented Strategies for Addition with Two-Digit Numbers:

Add Tens, Add Ones, Then Combine

46 + 31
40 and 30 is 70
6 and 1 is 7
70 nd 7 is 77

Invented Strategies for Subtraction by Counting Up:
Add Tens to Get Close, Then Ones

78-23

Begin with 23 and add 10's: 33, 43, 53, 63, 73,)
This is 5 sets of 10, which equals 50.
Then count up from 73 to 78 equals 5.
Therefore, 50 plus 5 equals 55.

e. Technology

"Virtual manipulatives should NOT take the place of concrete manipulation of objects/materials. Once conceptual understanding has been reached, you may move to pictorial representations and then virtual manipulatives. Concrete manipulatives should be the focus of learning to build conceptual understanding. Real life situations/representations are critical for conceptual understanding."

f. Assessing the Lesson:

Formative assessment is embedded with lessons through questioning and observations. However, other formative assessment strategies should be used.

Observe the students solving the following problems. Give them manipulatives to help solve the problems. While observing the students, be sure to document and ask clarifying questions to gage students' understanding.

Jimmy wanted scored 23 points in the first basketball game and 25 in the second game. How many points did Jimmy score in both games?

Laura wanted to buy a puppy that cost $85, she has saved $43. How much more money does Laura need

III. Assessing the Module

At the end of this module summative assessment is necessary to determine student understanding of the connections among and between the indicators addressed in this module. The following examples of possible assessment strategies may be modified as necessary to meet student/teacher needs. The examples are not derived from nor associated with any standardized testing.

1-2.8 Generate strategies to add and subtract without regrouping through two-digit numbers.

The objective of this indicator is to generate which is in the "create conceptual" knowledge cell of the Revised Taxonomy. The create means to put ideas together into a new structure; therefore, students use prior knowledge to generate new strategies. The learning progression to generate requires students to recall basic addition and subtraction facts and understand place value. Using concrete and/or pictorial models, students apply their understanding of number relationships to determine how to solve story problems. As students analyze information (3-1.1) from these experiences, they generate mathematical statements (3-1.4) about the relationships they observe then explain and justify their strategies (3-1.3) to their classmates and their teachers. Students recognize the limitations of various strategies and representations (3-1.8) and use correct, complete and clearly written and oral language to communicate their ideas (3-1.5).

When assessing this module, it is important to observe the children solving the problems and ask them to explain their thinking.

For these problems, provide the children with a variety of maniuplatives; ask the children to explain their strategies and reasoning. It is best to work with students individually or in small groups to observe them while creating strategies. Ask clarifying questions and record notes.

Jimmy had 24 pencils. He lost 12 of them. How many pencils did he have left?

Jenny needed 34 pens. She already had 12 pens. How many more pens does she need to buy?

Carrie brought 46 cupcakes for her birthday party. There were 20 cupcakes left. How many cupcakes did the guests eat?

Miss Davis brought 28 blue crayons and 41 red crayons to class. How many crayons did she bring altogether?

Kate sang for 36 minutes. Jillian sang for 24 minutes. How much longer did Kate sing than Jillian?

On Monday, Sam found 16 shells on the beach, on Tuesday he found 14 more. How many shells does Sam have?

Kris has 15 dolls in her collection. Her friend, Ella has 13 dolls. How many dolls do they have all together?

Earl has 25 blue marbles and 21 red marbles. How many marbles does he have in all?

Sarah picked 16 daisies and 12 roses. How many flowers does she have in all?

MODULE

3-3

Dimensionality/Plane and Spatial Reasoning

This module addresses the following indicators:

1-4.1 Identify the three-dimensional geometric shapes, prism, pyramid, and cone. (A1)
1-4.2 Analyze the two-dimensional shapes circle, square, triangle, and rectangle. (B4)
1-4.3 Classify two-dimensional shapes as polygons or nonpolygons. (A2)
1-4.4 Identify a line of symmetry. (B1)
1-4.5 Use the positional and directional terms, *north, south, east* and *west* to describe location and movement. (A3)

This module contains __5__ lessons. These lessons are **INTRODUCTORY ONLY**. Lessons in S3 begin to build the conceptual foundation students need. **ADDITIONAL LESSONS will be required** to fully develop the concepts.

I. Planning the Module

The first bullet under the Continuum of Knowledge represents students prior knowledge and/or skills related to this standard. It is recommended that students are pre-assessed on this prior knowledge.

Continuum of Knowledge

1-4.1 Identify the three-dimensional geometric shapes, prism, pyramid, and cone. (A1)

- In Kindergarten, students were to identify the three dimensional shapes cube, sphere, and cylinder. (K-4.1)
- In First Grade, the students are to identify the three-dimensional shapes, prism, pyramid, and cone. (1-4.1)
- In Second grade, the students will be analyzing three-dimensional shapes spheres, cubes, cylinders, prisms, pyramids, and cones according to the number and shapes of the faces, edges, corners, and bases of each. (2-4.1)

1-4.2 Analyze the two-dimensional shapes circle, square, triangle, and rectangle. (B4)

- In Kindergarten students were asked to identify and name the two-dimensional shapes, circle, square triangle, and rectangle. (K-4.1) Students in kindergarten should also be able to give examples of a circle, square, triangle, and rectangle and also be able to draw a picture of each these two-dimensional shapes.
- In First grade, students are to analyze a circle, square, triangle and rectangle according to the number of corners and sides, if any, involving these shapes (1-4.2).
- In second grade, students do not have to analyze two dimensional shapes.

1-4.3 Classify two-dimensional shapes as polygons or nonpolygons. (A2)

- In kindergarten, students identified and named the two dimensional shapes square, circle, triangle, and rectangle. (K-4.1) Students should also be able to represent these shapes as well. (K-4.2)
- In first grade, students classify (group) two dimensional shapes as polygons or non polygons. (1-4.3)
- In second grade, students will be predicting the results of combining and subdividing polygons and circles. (2-4.3)

1-4.4 Identify a line of symmetry. (B1)

- In kindergarten, students were not introduced to the concept of symmetry.
- In first grade, students will have to identify a line of symmetry with two-dimensional shapes (1-4.4)
- In second grade, students will identify multiple lines of symmetry (2-4.2)

1-4.5 Use the positional and directional terms, *north, south, east* and *west* to describe location and movement. (A3)

- In kindergarten, students use the positional words near, far, below, above, beside, next to across from, and between to describe the location of an object (K-4.3) and students used the directional words left, and right to describe movement (K-4.4)
- In first grade, students will use the positional and directional terms, north, south, east, and west to describe location and movement (1-4.5)
- In second grade, students are not using positional and directional terms.

Key Concepts/Key Vocabulary

*Three-dimensional
*Prism
*Pyramid
*Cone
*Two-dimensional
*Corner
*Side
*Circle
*Square
*Rectangle
*Triangle
*polygons
*nonpolygons
*symmetry
line of symmetry
North
South
East
West

II. Teaching the Lesson: 3-3A Identify Basic 3-Dimensional Shapes

1-4.1 Identify the three-dimensional geometric shapes, prism, pyramid, and cone. (A1)

For this indicator, it is **essential** for students to:

- Recognize a prism, pyramid, and a cone
- Identify a prism, pyramid, and cone in the environment
- Understand that three-dimensional means a shape has space or it can be filled. It can be seen from all sides.
- Recognize a shape that is not a prism, pyramid or cone

For this indicator, it is **not essential** for students to:

- Analyze the faces, edges, bases, or corners of a prism, pyramid and a cone

- Identify the attributes of a prism, pyramid and cone (sliding, stacking, rolling)

Teacher Notes: Students will identify prisms, pyramids, and cones. When identifying the three-dimensional shape pyramid, experiences would include both square pyramids (square base with four triangular faces) and triangular pyramids (triangular base with three triangular faces). Students should examine the two types of pyramids and be able to describe the differences and similarities. Research states that students need multiple experiences with two-dimensional shapes and three-dimensional shapes. It is important for students to have the ability to identify common shapes, identify likenesses and differences among the shapes. Students need to have an awareness of geometric shapes in the world, which will aide them in discovering their own definitions/meanings of the shapes.

a. Indicators with Taxonomy

1-4.1 Identify the three-dimensional geometric shapes, prism, pyramid, and cone. (A1)
Cognitive Process Dimension: Remember
Knowledge Dimension: Factual Knowledge

b. Introductory Lesson:

Materials Needed:

- *Geo-blocks or other three-dimensional objects (such as prism, square pyramid, triangular pyramid, cone) to display for children*
- *Prism, square pyramid, triangular pyramid, and cone-1 set of for each group of 4 students (attached are copies of 3-shapes to copy on heavy paper if needed to make shapes)*
- *Chart paper/marker*
- *Geometric Handout-one for each group (see attachment)*
- *Geometric Handout-one per child*
- *Optional: Camera*

Lesson

This lesson will be whole group and small groups.
State that during this lesson they are going to explore and identify 3-dimensional geometric shapes. Gather all of the children around and ask the children what are the characteristics of 3-dimensional shapes? Display the following shapes: prism, square pyramid, triangular pyramid and cone. Explain that they are going to receive a set of these shapes for their group and they are going to explore the objects within their groups; looking for characteristics of their shapes. Give the children ample time to explore each object and record their

observations. (See attached recording sheet.) Afterwards, the teacher should ask the students to share out their findings and the teacher should record their observations. Allow the children to construct their own definition/meaning of each shape. For example, state this is a prism, what are the characteristics of this prism. Ask clarifying questions like, "Why is that true? How did you reach that conclusion?" Continue this with all of the other shapes. Next, take the children on a "Shape Walk" around the building to find these shapes. Instruct the children to walk around the building writing down or drawing pictures of items that have the same shape as the prism, pyramids (square and rectangular), and cone. If possible, take pictures of the shapes and allow the children to create a Microsoft photo story. The children can record their voices and tell about the shapes they found. For homework, ask the students to find these shapes at home and bring the list/drawings in the next morning to share with class.

c. Misconceptions/Common Errors:

In kindergarten, the students learned to identify a cube and now in first grade the cube is now named a prism. *Students may have difficulty learning the new terminology in the beginning.*

d. Additional Instructional Strategies/Differentiation

Three-Dimensional Shape Walk

It may be necessary to review the shapes that students learned in Kindergarten and compare them to the shapes they are required to learn in first grade.

In identifying three-dimensional shape pyramids students should have experiences with square pyramids (square base with four triangular faces) and triangular pyramids (triangular base with three triangular faces)

The teacher will provide the exposure to the shapes and the name of each of the shapes to the student but students exploring these shapes in their environment will strengthen their ability to remember (identify) them.

Three D Shape Walk: Students bring objects from home that represents these geometric shapes: prism, pyramid, and cone. Place the objects around the classroom and ask the children to do a "gallery walk" around the classroom identifying each shape. Instruct students to take notes in a notebook by drawing pictures or writing observations. Afterwards, have a group discussion:

- Which items are prisms?
- Which items are cones?
- Which items are pyramids? (Square pyramids and triangular pyramids)

e. Technology

"Virtual manipulatives should NOT take the place of concrete manipulation of objects/materials. Once conceptual understanding has been reached, you may move to pictorial representations and then virtual manipulatives. Concrete manipulatives should be the focus of learning to build conceptual understanding. Real life situations/representations are critical for conceptual understanding."

National Library of Virtual Manipulatives
http://nlvm.usu.edu/en/applets/controller/query/query.htm?qt=geometry&lang=en

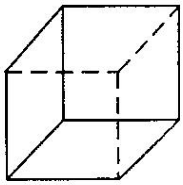
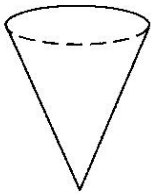
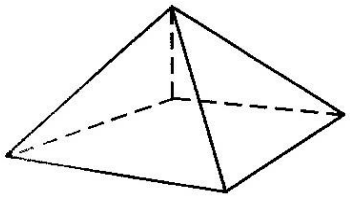
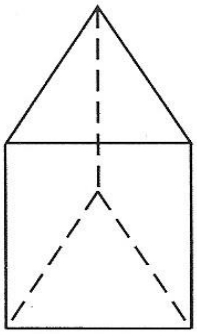
f. Assessing the Lesson:

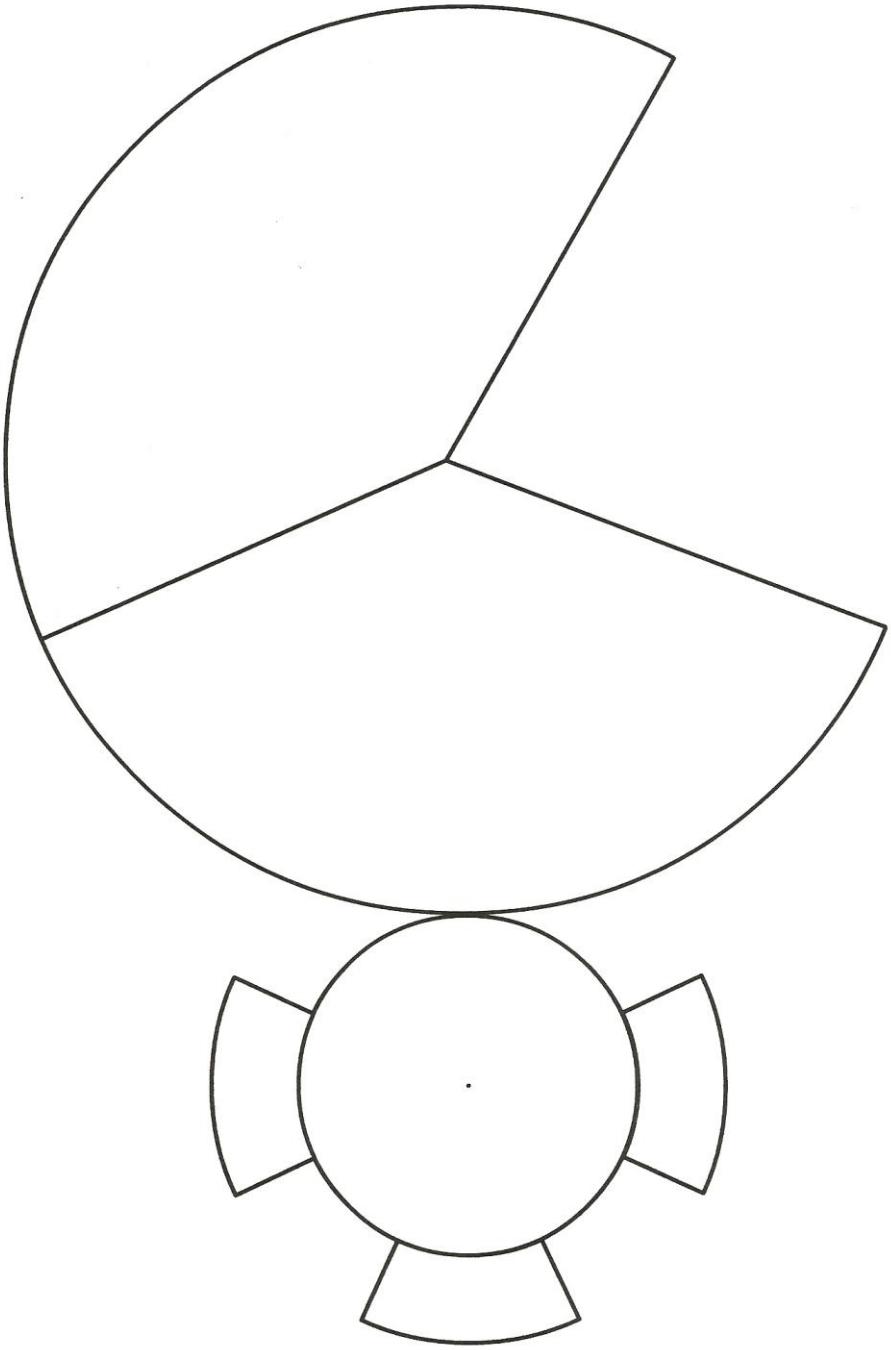
Formative Assessment is embedded within the lesson through questioning and observations. However, other formative assessment strategies should be used.

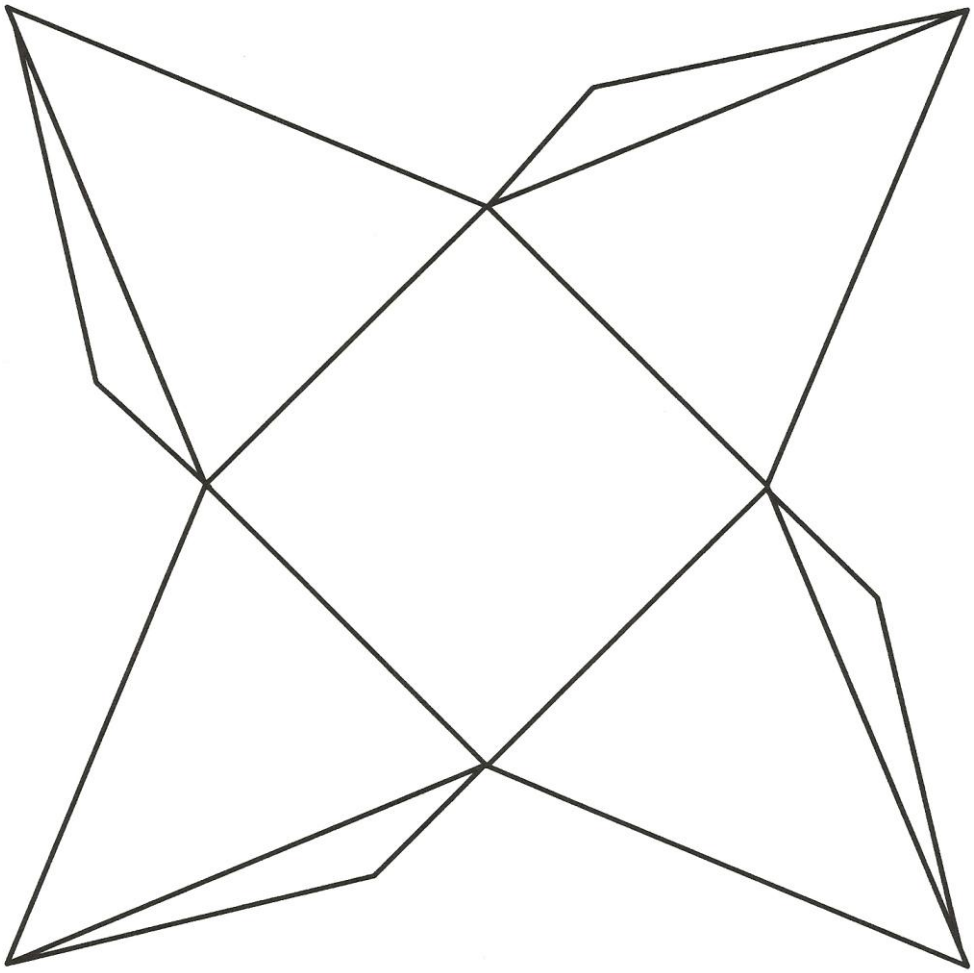
This assessment is administered through an interview. Present the shapes to the students ask the student to observe the shapes.

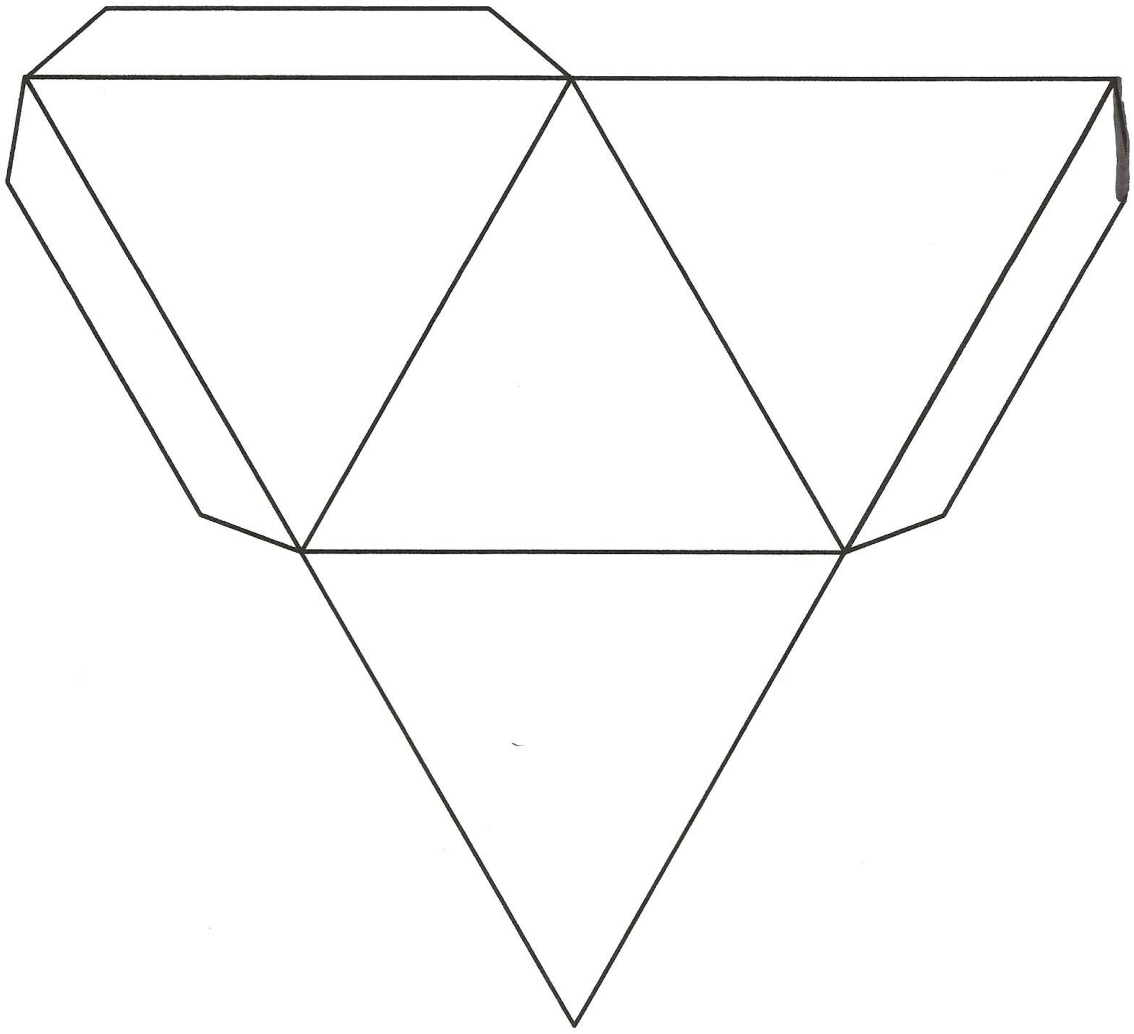
- *Tell me about these shapes?*
- *What are some things that you notice about these shapes?*
- *Can you name the shapes?*
- Looking at the shapes, which shapes resembles a box?
- Which shapes resembles a ball?
- Which shape has a pointed top?
- Which shapes are similar?
- Which shapes are different?

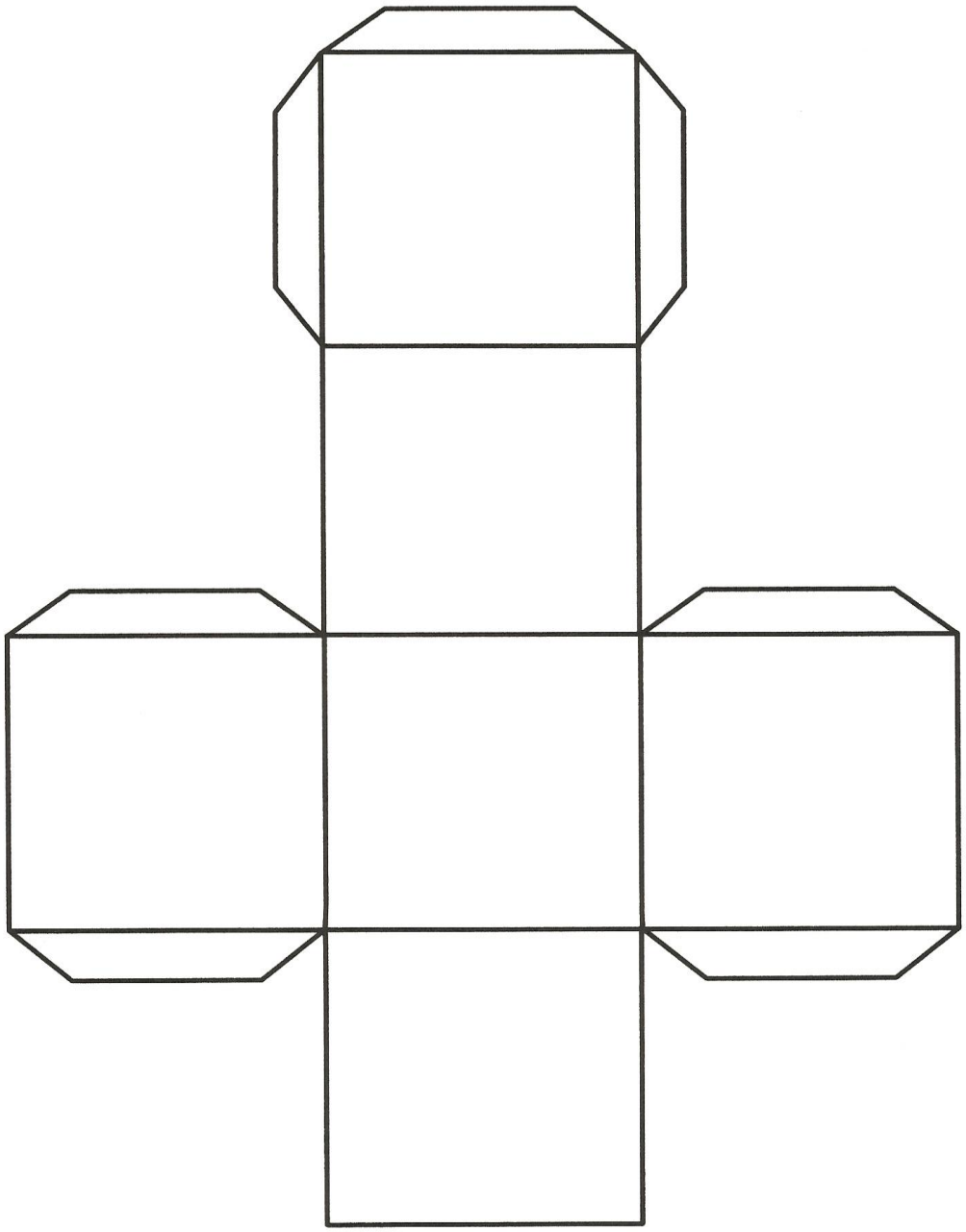
Geometric Handout









2.Teaching Lesson 3-3B: Two Dimensional Shapes

1-4.2 Analyze the two-dimensional shapes circle, square, triangle, and rectangle. (B4)

For this indicator, it is **essential** for students to:
- Recognize a circle, square, triangle, and rectangle in the environment.
- Use varying sizes of these shapes to show that they still have the same number of corners and sides regardless of size.
- Identify sides and understand that a side is straight.
- Identify corners and understand that corners exist where two sides meet.
- Represent the two dimensional shapes circle, square, rectangle and triangle given the number of sides and corners.
- Use concrete models to analyze the properties of these shapes

For this indicator, it is **not essential** for students to:
- Analyze shapes other than circles, squares, triangles, or rectangles

Teacher Notes: Research states that students need multiple experiences with two-dimensional shapes and three-dimensional shapes. It is important for students to have the ability to identify common shapes, identify likenesses and differences among the shapes. Students need to have an awareness of geometric shapes in the world, which will aide them in discovering their own definitions/meanings of the shapes. The students should analyze circles, squares, triangles and rectangles according to the number of sides, if any. With two-dimensional shapes, students should be able to further classify these shapes as polygons and nonpolygons.

a. Indicators with Taxonomy

1-4.2 Analyze the two-dimensional shapes circle, square, triangle, and rectangle. (B4)
Cognitive Process Dimension: Analyze
Knowledge Dimension: Conceptual Knowledge

b. Introductory Lesson:

Adapted from Hands-On Standards: Grades1-2, Learning Resources, 2006, Pages 74-75.

Materials Needed:
- *Two dimensional shapes: circle, triangle, rectangle (commercial or paper shapes)*
- *Geo-boards-One per two students*

- *1-Box of Rubber bands*
- *2 Pieces of Chart Paper/ one marker*

Suggested Literature Connection:
So Many Circles, So Many Squares by Tana Hoban

During the lesson:

Instruct the students to gather around the carpet or another area in the room so that all students can see. Tell the students that they are going to analyze two-dimensional shapes. Ask the students what is a two-dimensional shape? Record the responses on the chart paper. Show the students a model of a square, and ask the students how many corners does a square have? How many sides? Record the students' responses on chart paper. Show the students a model of triangle. Ask the students how many corners does a triangle have and how many sides? Record their responses on chart paper. Next, display a model of a square and a rectangle. What similarities and differences do you see? Ask how is a square the same as a rectangle? How is a square different from a rectangle? Continue this process with other shapes, for example, how is a triangle similar or different from a square? Rectangle? Display a model of a circle and ask, is the circle similar or different from any of the other shapes (triangle, circle, square)? Continue to record the responses on the board or on chart paper. Instruct the children to go back to their seats and give each pair of students a geo-board and a rubber band. Instruct the students to work together with their partner to create two-dimensional shapes. Read the following descriptions of the shapes and ask the students to create them after hearing its description. While the children are working, walk around to the groups to observe the students' shapes. Ask clarifying questions if needed. Variation: Ask the students to hold up their boards as they create their shapes.

Create a two-dimensional shape that has four straight sides of equal (congruent) length and four corners.

Create a two-dimensional shape that has four sides with two "twin sides" that look the same on opposite ends. This shape has two short sides and two long sides. This shape also has four corners.

Create a two-dimensional shape that has three sides, and three corners.

Create a two-dimensional shape that resembles a ring. (Note: this shape cannot be constructed on a geo-board, but allow the children to try it and have a discussion. Ask the children to explain why they couldn't make a circle out of a geo-board.)

Afterwards, instruct the students to look the charts. Ask the students if they would like to add or take away anything from the chart. To close the lesson, write the following questions on the board. "Thinking about today's lesson, what have you learned about circles, squares and rectangles?"

c. Misconceptions/Common Errors

Students might confuse square and rectangle, since both have four sides and four corners. Explain the fact that in all squares, all four sides are equal(congruent) length; and in all rectangles only opposite sides are equal, but all four sides are not. When students create a triangle, do not emphasize making a specific type of triangle. It is important for students to analyze triangles and know that all triangles have three sides and it is ok that all sides are not the same length. The students will learn about different types of triangles in fourth grade.

d. Additional Instructional Strategies/Differentiation

Suggested Literature Connections

So Many Circles, So Many Squares by Tana Hoban

National Library of Virtual Manipulatives
http://nlvm.usu.edu/en/applets/controller/query/query.htm?qt=geometry&lang=en

e. Technology

"Virtual manipulatives should NOT take the place of concrete manipulation of objects/materials. Once conceptual understanding has been reached, you may move to pictorial representations and then virtual manipulatives. Concrete manipulatives should be the focus of learning to build conceptual understanding. Real life situations/representations are critical for conceptual understanding."

National Library of Virtual Manipulatives
http://nlvm.usu.edu/en/applets/controller/query/query.htm?qt=geometry&lang=en

f. Assessing the Lesson:

Formative Assessment is embedded within the lesson through questioning and observation. However, other formative assessments strategies should be used.
The children can answer these on an exit ticket or in their notebooks, or as a whole group.

- *Thinking about today's lesson, what have you learned about two-dimensional shapes?*
- *Draw an example of a triangle and explain its characteristics.*
- *Draw an example of a rectangle and explain its characteristics.*
- *Draw an example of a square and explain its characteristics.*
- *Draw an example of a circle and explain its characteristics.*

3.Teaching Lesson 3-3C: Polygons and Nonpolygons

1-4.3 Classify two-dimensional shapes as polygons or nonpolygons. (A2)

For this indicator, it is **essential** for students to:

- Recognize that polygons are closed figures consisting of no curved lines.
- Recognize that non polygons are figures that are either closed with curved lines or open and consist of lines that are straight and/or curved.
- Understand that two dimensional shapes are flat

For this indicator, it is **not essential** for students to:

- Combine and subdivide polygons and circles.

Teacher Notes: The students will classify two-dimensional shapes as polygons/nonpolygons; this is simply factual information. It is important for the children to use the concept and terminology of polygon/nonpolygon in identifying two-dimensional shapes. Students need to know that polygons are closed shapes with no curved lines and nonpolygons are open shapes with straight/and or curved lines.

a. Indicators with Taxonomy

1-4.3 Classify two-dimensional shapes as polygons or nonpolygons. (A2)
Cognitive Process Dimension: Remember
Knowledge Dimension: Conceptual Knowledge

b. Introductory Lesson

Materials Needed:

- 1 set per 3-4 students of a variety of cut-outs polygons that are closed with straight sides, closed with curved side, closed with straight and curved sides. (See examples) Place the shapes in a bag.
- Chart Paper and marker
- 1 set of the cut outs mentioned above for the children to have at least one polygon and one non polygon each

During the lesson:

Instruct the students to gather in a circle. Use one of the student bags and instruct each student to select a shape. Ask the students to quietly observe their shape. Go around the group and ask the students to show their shape to the group and ask the students to share their thoughts about their shapes. Next, collect all of the shapes and place them in a pile where all of the students can view each shape. Choose a shape that is a **polygon** and hold it up for the students to see the shape. Instruct the students to come up a few at a time and find a shape that is like the one you selected. Ask the students to describe their shapes. Record on the chart paper: **Target A Shapes**. Next, choose a shape that is a **nonpolygon** and hold it up for the students to view. Instruct the students to come up a few at a time to find a shape that is similar to your shape. Ask the children to describe their shapes. Record their responses on chart paper **Target B Shapes**. Now that the students have a better understanding of the activity, divide them into groups of 3-4 students. Instruct the students to select one shape from the collection to be the "target" shape and find as many shapes as they can they can that are like the "target" shape. Ask the students to come up with one rule for their shapes, for example, "straight sides" or "curved sides." The children can only choose one rule. The students will sort their shapes based on their rule. Tell the children that you will come around to their group trying to guess their rule. While you are walking around observing, listen for the students' ideas to determine if they are using non-geometric terms to describe the shapes or geometric thinking. Encourage the students to sort their shapes in a variety of ways. Instruct the students to walk around the room to observe other groups to guess their rule. Afterwards, ask the students to place all of the shapes back to the center of their desk/workstation. Refer the children back to the chart **"Target A Shapes."** Show the students an example of a polygon and ask them to tell you what they observed about these shapes. (possible responses: straight sides, corners, closed shape). Tell the students that these shapes are **polygons.** (Closed shapes with straight lines and corners.) Afterwards, refer the students back to the **"Target B Shapes"** Show the students an example of a nonpolygon and ask

students to tell you what they observed about these shapes. (possible responses: curved shapes, closed shapes, some straight lines but not all straight sides). Tell the students that these shapes are **nonpolygons.** Explain that the prefix "non" means not, therefore, a nonpolygon is not a polygon. To wrap up the lesson, instruct the children to draw examples of polygons and nonpolygons and explain their reasoning.

c. Misconceptions/Common Errors

- Students may confuse all closed figures as polygons. Clarity needs to be given to closed figures that consist of lines with curves and the fact that they are non polygons.

d. Additional Instructional Strategies/Differentiation

- *This activity will need to be repeated a few times during the year in order to build a strong conceptual understanding of polygons.*
- *The students can group the shapes by using more than one rule.*
- *The students can go on a shape walk to find polygons and nonpolygons and record their observations.*
- *The students can draw their own examples of polygons and nonpolygons.*
- Any resources used for Indicator 1-4.2 can be used to aide in understanding the concept of polygons and non polygons.
- A Venn Diagram or T- charts can be used to categorize polygons and nonpolygons. Students can be given examples of both to put in the respective category. They should also be able to explain why the shape fits into that category.

e. Technology:

"Virtual manipulatives should NOT take the place of concrete of objects/materials. Once conceptual understanding has been reached, you may move to pictorial representations and then virtual manipulatives. Concrete manipulatives should be the focus of learning to build conceptual understanding. Real life situation/presentations are critical for conceptual understanding."

National Library of Virtual Manipulatives
http://nlvm.usu.edu/en/applets/controller/query/query.htm?qt=geometry&lang=en

f. Assessing the Lesson:

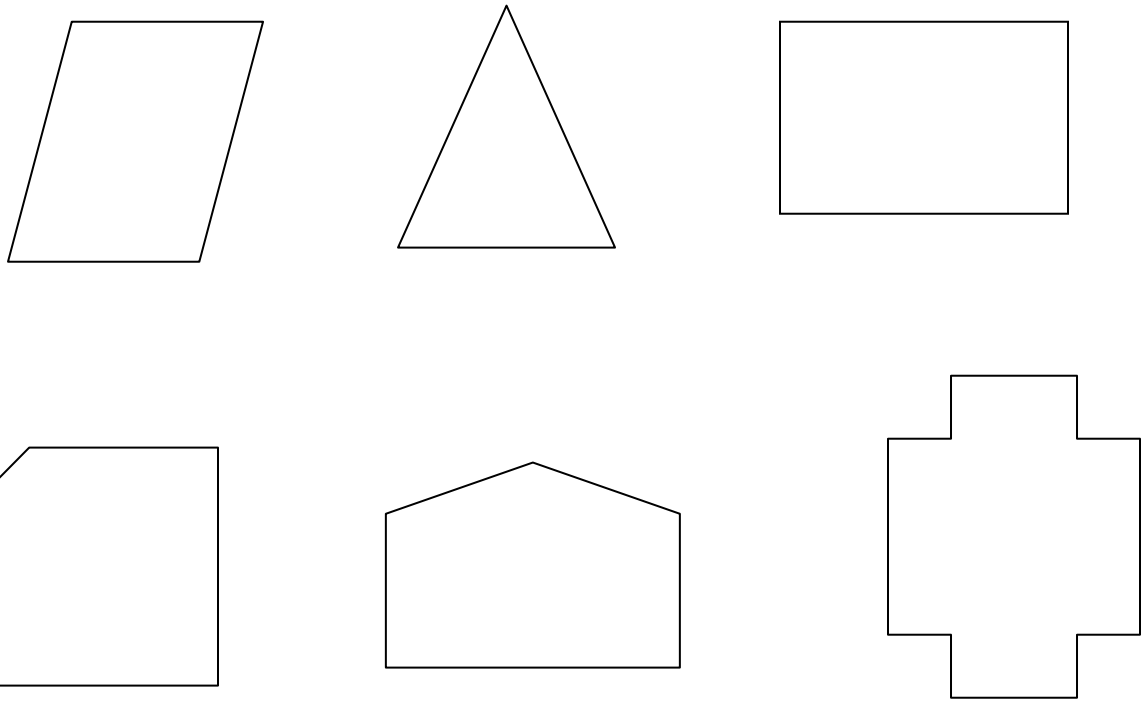
Formative assessment is embedded within the lesson through questioning and observations. However, other formative assessments strategies should be used.

Interview the children individually or *in small groups. Place a variety of shapes on the table in random order. Ask the students to classify the shapes into polygons and non polygons. Observe and record data on each student.*

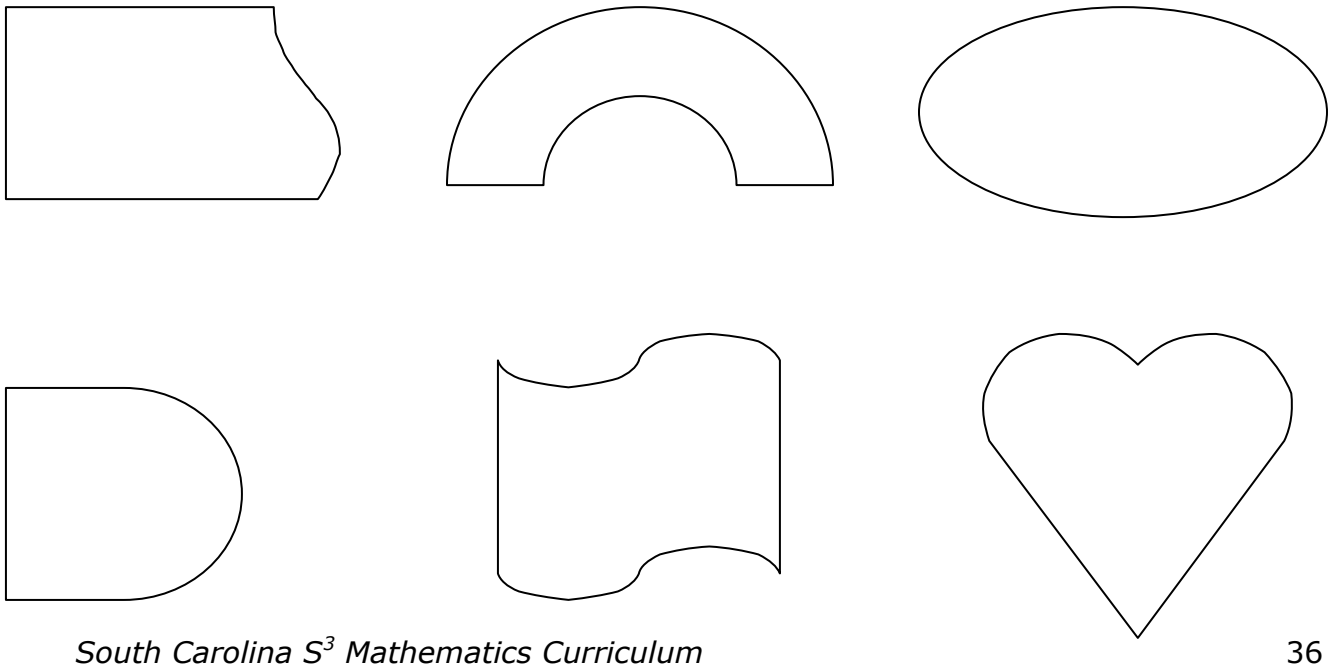
1. As you think about today's lesson, what types of shapes are considered polygons?

2. As you think about today's lesson, what types of shapes are considered nonpolygons?

Examples of Polygons



Examples of Nonpolygons



4.Teaching Lesson 3-3D: Line of Symmetry

1-4.4 Identify a line of symmetry. (B1)

For this indicator it is **essential** for students to:

- Understand the concept of half
- Identify only one line of symmetry in a shape.
- Understand that a line of symmetry cuts a shape in half having the same amount of the shape on either side of the line.

For this indicator it is **not essential** for students to:

- Identify multiple lines of symmetry in a shape.

Teacher Notes: Typically when we think of symmetry in the 1st grade we think of using a MIRA, mirror, or some similar tool to complete the missing half of a picture. However, students understanding of symmetry should go much deeper than that. Students should examine objects in order to determine if they have a line of symmetry, the two-dimensional shapes (square, triangle, rectangle) which they identified in kindergarten. When teaching this concept, used the terms such as "diagonal," "vertices" and "horizontal" but students are not required to use these words. The two-dimensional shapes mentioned are not the only experiences students should have with symmetry. Experiences my include pictures of houses, animals, etc.

Students are expected to identify only one line of symmetry in 1st grade, therefore the use of a circle may be avoided in order to eliminate student confusion over the infinite lines of symmetry. Also keep in mind that not all triangles have symmetry such as a scalene triangle (when all side lengths are unequal). It is important that student experiences include all types of triangles so students can come to the conclusion that not all triangles have a line of symmetry. Students may notice that some shapes have multiple lines of symmetry and that is wonderful. However, the expectation at first grade is that students understand what factors affect whether or not a shape has a line of symmetry and can identify a line of symmetry in a given shape.

a. Indicators with Taxonomy

1-4.4 Identify a line of symmetry. (B1)
Cognitive Process Dimension: Remember
Knowledge Dimension: Conceptual Knowledge

b. ***Introductory Lesson****: Adapted from Hands On Standards for Grades 1-2, 2006, ETA Cuisenaire*

Materials Needed:

- Geo-Boards (1 per pair of students)
- 1-Piece of white paper for each student
- 1-Pair of scissors for each student

Suggested Literature Connections:

- Symmetry in Nature by Allyson Valentine Schrier
- Give Me Half by Stuart J. Murphy
  (to reinforce the concept of cutting in half)

Teacher Note: Walk around and observe to collect data on students' understanding.

During the Lesson:
Begin the lesson by giving each child a piece of paper. Instruct the children to fold the paper in half and cut out a shape of their choice on the fold of the paper. Ask the children to open their paper and observe their illustration. When they open their paper, the fold line represents a line of symmetry. At this point in the lesson, ask the students to describe what happened to their picture. (Possible responses: our picture is divided in half, line of symmetry, same on both sides). Record the responses on the board. Tell the students that they are going to do an activity with symmetry. Ask the students if they know what symmetry is. After hearing the responses and recording them, explain that a shape has symmetry when it can be cut into two pieces and have exact images of each other. Tell the children that today are going to help solve a problem. Post this problem on the board and read aloud.

Brooklyn's teacher told her that a butterfly's body has symmetry. Brooklyn's teacher told her to find other shapes that have symmetry. Help Brooke find other shapes with symmetry.

At this point in the lesson, ask the student to brainstorm ways to discover if objects have symmetry. Listen to the responses. Ask the children to recall the definition of symmetry. (An object has symmetry if it can be divided into two equal parts.) Record the responses on the board. Give each pair of children a geo-board and 3 rubber bands. Instruct the children to make a square on the geo-boards. Ask the students, does the square have symmetry? Explain that the square does have symmetry, because it can be divided into two equal pieces.(At this point in the lesson, you may want to discuss if their square has symmetry that is horizontal or diagonal.) Instruct the

students to work with their partners to create 3 other shapes on their geo-boards that have symmetry. Walk around and observe students' shapes and ask clarifying questions and ask students to explain their thinking. Ask the children to walk around the room to observe groups' designs and have discussions. Afterwards, instruct the students to create shapes that do not have symmetry. Ask the students to share their shapes. While the children are sharing, ask the children if they agree or disagree that the shapes do not have a line of symmetry. Afterwards, instruct one student in each pair to place a line of symmetry in the middle of their geo-boards. The other student in the pair will create an object on one half of the line of symmetry and the partner will make the exact shape on the other side of the board. To wrap of the lesson, refer the students to the board to add/delete to their previous thoughts about symmetry. Instruct the students to draw/create an object that has symmetry.

c. Misconceptions/Common Errors

- When identifying a line of symmetry, students may think that all triangles have a line of symmetry (scalene triangles where all sides of the triangle are unequal do not have a line of symmetry).
- Some students may or may not recognize that objects have more than one of line symmetry. However, if students discover this during the lesson, tell them that some objects have more than one line of symmetry. This is a great opportunity to discuss that they can run in any direction- horizontally, vertically, or diagonally. However, students will not move to finding multiple lines of symmetry until 2nd grade.

d. Additional Instructional Strategies/Differentiation:

- Some teachers may elect not to use a circle when identifying a line of symmetry due to the fact that a circle has an infinite number of lines of symmetry
- Identifying a line of symmetry is not limited to squares, rectangles, circles (if used) and triangles.
- As you are modeling and explaining line of symmetry, use terms such as "diagonal", "vertices", and "horizontal". Although it is not necessary for students to use these terms, it is always important to use appropriate mathematical terminology.
- Give the children a sheet of paper and ask them to fold it in half. Instruct the students to draw a picture on one half of the paper. Use a MIRA to draw the other half of the picture.
- Pattern Block Mirror Symmetry: From Teaching Student-Centered Mathematics Grades K-3 by Van de Walle and Lovin, 2006.
- Give students a plain piece of paper and instruct them to fold the paper in half. Give the students 6-8 pattern block pieces and ask

them to make a design on one side of the line of symmetry. Use a MIRA to draw the image of the design on the opposite line of symmetry. Challenge them to make designs that have more than one line of symmetry.

- Folding Activity: Give the students the following shapes cut-outs: circle, square, rectangle, and a scalene triangle. Instruct the students to fold the shapes to test lines of symmetry. (This activity is best used for students who have a clear understanding of symmetry.)
- Work with your school's art teacher for symmetry!

e. Technology

"Virtual manipulatives should NOT take the place of concrete manipulation of objects/materials. Once conceptual understanding has been reached, you may move to pictorial representations and then virtual manipulatives. Concrete manipulatives should be the focus of learning to build conceptual understanding. Real life situations/representations are critical for conceptual understanding."

f. Assessing the Lesson:

Formative assessment is embedded within the lesson through questions and observation. However, other formative assessment strategies should be used.

1. Interview the children individually or in small groups. Give the students pattern blocks and instruct the students to show you the line of symmetry.

2. Interview the children individually or in small groups. Using a geo-board, create shapes that have symmetry and ones that do not. Instruct the students to give an explanation for shapes that do not have a line of symmetry.

5.Teaching Lesson 3-3E – Positional and Directional Terms

1-4.5 *Use the positional and directional terms, north, south, east* and *west* to describe location and movement. (A3)

For this indicator it is **essential** for students to:

- Understand that north/south and east/west are opposites
- Locate three positions given one position (Here is north in which direction is south, east, and west).
- Describe the location of an object in reference to other objects

- Move an object using the directional terms (two spaces/units east and five spaces/units south) on a simple map grid.

For this indicator it is **not essential** for students to:
- Locate directional terms northeast, southeast, northwest or southwest.
- Plot points numerically on grids.

Teacher Notes: Students need to know that north/south and east/west are opposites. Students also need to examine the relationship between north/south and east/west and be able to locate the positions given one.

a. Indicators with Taxonomy

1-4.5 Use the positional and directional terms, north, south, east and *west* to describe location and movement. (A3)
Cognitive Process Dimension: Apply
Knowledge Dimension: Factual Knowledge

b. Introductory Lesson

Materials Needed:
- Tennis ball
- Overhead Projector
- Dry erase board with markers
- Large paper to label the room
- Markers

Suggested Literature Connection: The Greatest Gymnast of All by Stuart J. Murphy
(Reinforces the concept of opposites)

During the lesson:
Begin the lesson by throwing a tennis ball up in the air and ask the students "what direction(s) did the ball travel when I threw it?" After the students answer "up" ask the children if they know another name for the direction up, especially on a map. Explain that in this lesson they will learn some new words for different directions. Ask the students if they are going to give someone directions on how to get to school, what are some words they might use? (Straight, turn left/right, up, down, forward, backward.) On an overhead, show a simple map of a familiar place like their school or neighborhood. The map should include several pictures. Mark a starting point and an ending point. Ask the students for directions on how to get to the specified destination. They will use terms such as up, down, left, right. Draw a cardinal rose on the board displaying directional terms: North, South, West and East. Draw another one beside it using directional terms: Up,

Down, Left and Right. Point to each direction and recite the name of each and instruct the children to repeat. Ask the children what they notice about north/south and west/east. (They are opposite of each other, north is on top, south is on the bottom, west is on the left, east is on the right, etc.) Explain North is another word for up, South is another word for down, etc. As a class, label the room North, South, West, and East; use the words and the letters. Instruct a student to stand up in the middle of the room and give him a destination. (i.e. go to the book shelf, walk to the front of the room, go to the door). Instruct students to give directions in which to travel to get to the destination. Once everyone has had a turn giving/receiving directions, give the children the following destinations:

- To get to the teacher's desk, you must travel to the _____ (students will fill in the blanks)
- To get to the closet, you must travel to the _____

Continue this process daily and weekly to insure the students have a clear understanding of north, south, west and east.

c. ***Misconceptions/Common Errors:***

South is easily identified as being opposite north, but east and west can be a bit more tricky for children (or even adults) to fix in their minds. We always say *north*, *south*, *east* and *west*, and as we write from left to right it seems logical to put east on the left and west on the right. The usual way of remembering the correct way is that the first letters put together should spell WE that is, West East. Therefore, throughout teaching these directional terms, it may be useful to teach them in the order that we write them on a compass rose: North, South, West, East.

d. Additional Instructional Strategies/Differentiation

- The teacher should supply simple maps that display a compass with the specific directions north, south, east, and west to understand how directionality is applied in the real world. Students should be able to move themselves in the directions of north, south, east, and west. They should also be able to maneuver objects given specific directions (move the car two spaces north and then four spaces east). Resource: Social Studies Maps
- Given two objects on a map, students should be able to explain how to move from one object to the other (to get from the school to home you would go two spaces north and then three spaces west).

e. Technology

"Virtual manipulatives should NOT take the place of concrete manipulation of objects/materials. Once conceptual understanding has been reached, you may move to pictorial representations and then virtual manipulatives. Concrete manipulatives should be the focus of learning to build conceptual understanding. Real life situations/representations are critical for conceptual understanding."

http://classroom.jc-schools.net/basic/ssmaps.html

f. Assessing the Lesson:

Formative assessment is embedded within the lesson through questions and observation. However, other formative assessment strategies should be used.

This can be done whole group. (make sure there is enough room for movement) Review the compass rose. Ask the students to the following:
Move your body four steps north
Move your body 3 steps east
Move your body 6 steps south
Move your body 8 steps west
Observe the students' movements and record.

III. Assessing the Module

At the end of this module summative assessment is necessary to determine student understanding of the connections among and between the indicators addressed in this module. The following examples of possible assessment strategies may be modified as necessary to meet student/teacher needs. The examples are not derived from nor associated with any standardized testing.

1-4.1 Identify the three-dimensional geometric shapes, prism, pyramid, and cone. (A1)

The objective of this indicator is to identify, which is in the "remember factual" knowledge cell of the Revised Taxonomy table. Remember requires students to access relevant knowledge from long term memory. Factual knowledge is knowledge of terms, details and elements. The learning progression to **identify** requires students to recognize, name, and be able to locate the three-dimensional shapes, prism, pyramid, and cone. Students should recall what makes a shape three-dimensional and associate the name of the shapes with its physical property of being three- dimensional. As students identify these three-dimensional shapes, they should generalize connections among mathematics, the environment, and other subjects (1-1.7) by finding multiple informal representations to convey these mathematical ideas (1-1.8).

1-4.2Analyze the two-dimensional shapes circle, square, triangle, and rectangle. (B4)

The objective of this indicator is to analyze, which is in the "analyze factual" knowledge cell of the Revised Taxonomy table. Factual knowledge is knowledge of specific details, details and terminology; therefore, students analyze facts about two dimensional shapes to determine how they relate to one another and to the overall structure of two dimensional shapes. The learning progression to **analyze** requires students to recognize the two- dimensional shapes circle, square, triangle, and rectangle and to represent those shapes. Students identify and explain what a side and corner is and also calculate the total number of sides and corners of the two dimensional shapes circle, square, triangles, and rectangles. Students generate conjectures (1-1.2) about how the shapes are similar and different then exchange their ideas (1-1.2) with their classmates and their teacher. Students explain and justify answers (1-1.3) and generalize mathematical concepts (1-1.5) using an appropriate form of mathematical communication (1-1.6).

1-4.3 Classify two-dimensional shapes as polygons or nonpolygons. (A2)

The objective of this indicator is to classify, which is in the "understand conceptual" knowledge cell of the Revised Taxonomy table. To understand requires students to construct meaning. Conceptual knowledge is not bound by specific examples; therefore, students should be able to classify any two-dimensional shape as either a polygon or non polygon. The learning progression

to **classify** requires students to recognize and recall two-dimensional shapes. Students compare two dimensional shapes generating conjectures about the characteristics of polygons. Students exchange their mathematical ideas with their peers and teacher (1-1.2) then generalize mathematical concepts (1-1.5) using a variety of forms of mathematical communication to convey their understanding (1-1.6). After this dialogue, students apply their understanding to categorize two-dimensional shapes as a polygon or a non polygon.

1-4.4 Identify a line of symmetry. (B1)

The objective of this indicator is to identify, which is in the "remember factual" knowledge cell of the Revised Taxonomy table. Remember requires students to retrieve relevant knowledge from long term memory. Factual knowledge is knowledge of specific details; therefore, students should be able to use this fact to identify a line of symmetry. The learning progression to **identify** requires students to generating conjectures (1-1.2) about where the line of symmetry is located. Students exchange their mathematical ideas with their peers and teachers (1-1.2) and explain and justify their answers (1-1.3) using a variety of forms of mathematical communication (1-1.6). Students apply problem solving strategies (1-1.1) such as drawing a line or folding to verify their conjecture and identify the line of symmetry.

1-4.5 Use the positional and directional terms, *north, south, east* and *west* to describe location and movement. (A3)

The objective of this indicator is to use which is in the "apply factual" knowledge cell of the Revised Taxonomy table. Apply requires students to carry out or use a procedure in a given situation. Factual knowledge is knowledge of specific details, terminology and element; therefore, students apply their knowledge of positional and directional terms to describe the movement of an object and the location of objects in relation to other objects. The learning progression to **use** requires students to recall *the* directions left and right and forward and back. Students understand that north/south and east/west are opposites. As students use the specific terms, they should explain and justify answers to their peers and teacher (1-1.3) using a variety of forms of mathematical communication to convey their understanding (1-1.6). Students generalize connections among mathematics, the environment, and other subjects (1-1.7) by applying these terms in a variety of settings and explaining how to move an object from one location to another.

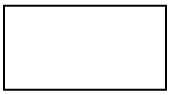
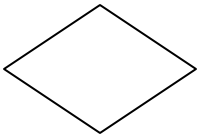
Since the lessons are based on teacher observation and student discussions, the summative assessment should be administered through student observation and discussion. One method could be a checklist with each of the three-dimensional shapes displayed.

Indicator 1-4.1 Identify the three-dimensional geometric shapes, prism, pyramid, (square pyramid and triangular pyramid) cone	
Task: Give the student a model of each 3-D shape. Ask the students to identify each shape. **Note:** When discussing the three different pyramid, ask the students to describe the similarities and differences.	**Comments**
Prism	
Pyramid	
Square Pyramid	
Triangular Pyramid	
Cone	

Since the lessons are based on teacher observation and student discussions, the summative assessment should be administered through student observation and discussion. One method could be a checklist with each of the two-dimensional shapes displayed.

Indicator 1-4.2 Analyze the two-dimensional shapes circle, square, triangle, and rectangle.	
Task: Give each student a two-dimensional shape. Ask the student to tell you about it each shape. Example: This is a square that has four sides and four corners. Explain how this shape if different from rectangle.	**Comments:**
Circle	
Square	
Triangle	
Rectangle	

Since the lessons are based on teacher observation and student discussions, the summative assessment should be administered through student observation and discussion. One method could be a checklist with polygons and nonpolygons.

Indicator 1-4.3 Classify two-dimensional shapes as polygons or nonpolygons	
Task: Show the students the two dimensional shapes. Ask the students are the shapes polygons or non polygons	***Comments***
	
	
	
	
	

Alternative Assessment: *Give the students a variety of two-dimensional shapes and ask them to classify the shapes into two categories: polygons and nonpolygons. Record data on students, use an example of the chart below.*

Polygons	*Non Polygons*

Indicator 1-4.4 Identify line of symmetry:
Since the lessons are based on teacher observation and student discussions, the summative assessment should be administered through student observation and discussion. Take notes/record students' progress.

- Give the students a variety of two-dimensional shapes. Ask the students to observe the shape and tell you if it has a line of symmetry.

- Give the students a geo-board. Create a shape and ask the students to use a rubber band to show the line of symmetry.

- Ask the students to look around the room to find shapes that have a line of symmetry. (examples: chalkboard, window, desk top, etc..)

- Give the students a kids' magazine and ask them to find as many items as possible with a line of symmetry.

Indicator 1-4.5-Use the positional and directional terms, north, south, west, and east to describe location and movement.

Softball Field		**Library**			**Grocery Store**
		School	**Laundry Mat**		**Gas Station**
Church		**Pizza Restaurant**		**Golf Course**	
Bobby's House		**Hardware Store**	**Burger Palace**		**Your Home**

Look at the map of your community. Read each statement, fill in north, south, west or east in the space provided.

1. **Your home is _____ of the grocery store**
2. **Your home is _____of Bobby's house.**
3. **The Pizza Restaurant is _____of the Hardware Store.**
4. **The Laundry Mat is_____ of the gas station.**