

Instructional Design  
First Grade Mathematics  
Bowling Green State University--EDTL 7100

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# First Grade Mathematics Instructional Design Rationale

When students transition from one grade level to another, the differences in the content difficulty can be drastic. Being a first grade teacher, I have witnessed the transition personally. Also, with the new common core state standards, the content “load” is heavier on students than it has been in the past.

The purpose of this instructional design is to reinforce concepts that were taught in kindergarten to enhance the learning process in the first grade. It is also intended to focus on the new common core standards for mathematics. The lessons provided in this instructional design follow the Basic Learning Model as described by Leigh Chiarelott. The activities also focus on student directed learning. There will be little instruction conducted by the teacher. The majority of the activities consist of hands on learning experiences as well as independent work to reinforce the concepts learned.

Once finished with the units presented, students will be able to better comprehend the concepts that were taught in kindergarten. It will also prepare them for more complex concepts that are taught in the upcoming grade levels. Once the basic mathematic skills are mastered, it sets the foundation for larger problems. Mathematics is a building subject, meaning that one topic and skill is necessary to be learned before moving on to the next. Each concept builds off of the previous concept.

# FIRST GRADE MATHEMATICS UNIT OUTCOMES

## SUBUNIT #1—SHAPES AND PATTERNS

- Identify basic shapes **(Knowledge/Comprehension)**
- Understand and identify characteristics of basic shapes **(Knowledge/Comprehension)**
- Classify objects into like groups or categories **(Knowledge/Comprehension/Application)**
- Explain similarities and differences between shapes **(Comprehension/Application)**
- Classify objects into like groups or categories **(Comprehension/Application)**
- Explain similarities and differences between shapes **(Knowledge/Comprehension/Application)**

## SUBUNIT #2—NUMBERS AND COUNTING

- Count from 0-100 **(Knowledge)**
- Skip count to 100 by two's, five's, and ten's **(Knowledge/Application)**
- Identify even and odd numbers **(Knowledge/Application)**
- Use word problems to identify ordinal words **(Knowledge, Comprehension/Application)**

## SUBUNIT #3—ADDITION

- Identify and explain various mathematics addition vocabulary words **(Knowledge/Comprehension/Application)**
- Recognize and understand addition strategies to help them solve addition facts **(Knowledge/Comprehension/Application)**
- Solve addition facts with sums up to twenty **(Knowledge/Comprehension/Application)**

## SUBUNIT #4—SUBTRACTION

- Identify and explain various mathematics subtraction vocabulary words **(Knowledge/Comprehension/Application)**
- Recognize subtraction strategies to help them solve subtraction facts **(Knowledge/Comprehension/Application)**
- Solve subtraction facts with differences between 0-20 **(Knowledge/Comprehension/Application)**

## SUBUNIT #1—SHAPES AND PATTERNS PRE-ASSESSMENT

It is important to conduct a pre-assessment of some sort before beginning a new unit. This helps the teacher identify what the student already knows about the topic. It also helps identify any struggle areas. The following pre-assessment will be given to each student during center time. This will allow me to conduct the pre-assessment individually. It will be given the day before the unit begins. It will consist of a basic checklist in which I will present the student with a flash card of a shape and I will ask the student to properly identify it. The second portion of the pre-assessment will be sorting. I will give the students a group of small shapes and ask the students to sort the shapes by color and size. I will not explain what sorting or classifying means at this point because I will want to know if they are capable of understanding what it means independently. These terms will be better identified and defined within the lessons and activities presented in the unit. I will use a checklist for this assessment as well. I will then ask the students if they can draw a pattern. Again, I will not explain what this means at this point to identify what the student knows about the concept. I will cover up the top portion of the checklist so the students can't see their results from the shape identification and sorting. I will use this pre-assessment to help me make accommodations or modifications throughout the unit and activities based on students' needs.

# SUBUNIT #1—SHAPES AND PATTERNS

## PRE-ASSESSMENT

### STUDENT NAME:

Student's ability to identify the following shapes:

SHAPE NAME	YES	NO	COMMENTS
Circle			
Square			
Rectangle			
Heart			
Oval			
Diamond			
Triangle			

Student's ability to sort:

SORTING OBJECTS BY:	YES	NO	COMMENTS
Size			
Color			

Student's Pattern:

### COMMENTS:

# LESSON PLAN #1

## SHAPE IDENTIFICATION

### **CONCEPT TO BE LEARNED:**

The concept that will be learned through this activity will be the ability of students to properly name and identify characteristics of basic shapes.

### **RATIONALE:**

The transition between kindergarten and first grade can be one of the most drastic changes in a child's academic life. It is important to refresh the students with basic concepts that should have been mastered in kindergarten. It is important to make sure the students understand and comprehend these basic skills prior to more complicated and complex skills.

### **UNIT OUTCOMES:**

- Identify basic shapes
- Understand and identify characteristics of basic shapes

### **ACTIVITY OBJECTIVES:**

- The students will be able to identify basic shapes
- The students will be able to correlate the number of sides to the particular shape
- The students will be able to listen to and follow directions carefully
- The students will be able to work together as a class and respect their peers
- The students will be able to also work independently and use problem solving strategies to find a solution to a question/problem

### **TIME ALLOTTED FOR ACTIVITY:**

45 minutes

### **MATERIALS NEEDED:**

- "Shape by Shape" by Suse Macdonald
- Shape flashcards
- Shape worksheet (Page 1)

### **INTRODUCTION:**

I will start the lesson by reading "Shape by Shape" to the students. As I am reading I will discuss the different shapes throughout the book. I will also prompt the following questions:

- What are the similarities and differences between the shapes in the book?
- How many sides does each shape have? (Ask as the shape appears in the book) (10 minutes)

### **ACTIVITY PROCEDURE:**

- I will explain to the class that I am using shape flashcards and I am going to give clues and hints to the shape that I am holding. For example:
  - This shape has three sides (Triangle)
  - How many sides does this shape have? (Hold up flashcard of shape)
- I will then explain to the class that we will be playing charades (A guessing game) Each student will pull a shape flashcard and have to describe that particular shape. An example would be: If a student chooses a rectangle.. the student could explain that it has four sides, is the same shape as the American flag, and is similar to a square but with different size lengths.
- I will explain that we will be respectful to each other while acting and describing is taking place and we will raise our hands when an answer is reached. Each student will receive a turn to act out and describe their shape.
- Once everyone has a turn, I will explain their independent work. The students will be doing a worksheet that has different riddles on it (similar to the game they just played) I will read the questions to them (in case some students aren't as fluent as others) and then they will record their answer.
- I will dismiss the students five at a time from the carpet to avoid "traffic jams" (20 minutes)
- I will then read each question on the worksheet and have the students record their answers.
- Once finished, we will review the answers and the students will be allowed to fix any mistakes that they made. (15 minutes)

### **HIGHER LEVEL QUESTIONING:**

- How many more sides does a rectangle have than a triangle? (Will initiate simple addition)
- If I took one side away from a square, how many sides would it have? (Will initiate simple subtraction)
- If a square loses a side, and the sides were rearranged, what shape could we create?

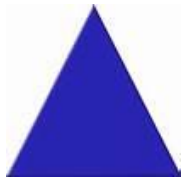
### **ASSESSMENT:**

I will do basic observations throughout the activity to make sure the objectives have been met. I will be able to observe the students during the charades game, as well as evaluate their answers on the worksheet. This will allow me to make any accommodations or modifications to future activities.

# NAME THAT SHAPE



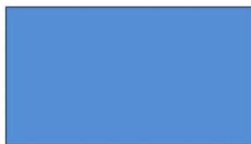
CIRCLE



TRIANGLE



SQUARE



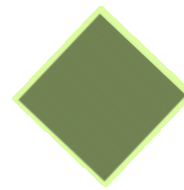
RECTANGLE



HEART



OVAL



DIAMOND

<p>1. I have three sides. I am the shape of pizza most of the time. I can even be the shape of cheese. What am I?</p>	<p>You are a _____.</p> <p>A drawing of the shape:</p>
<p>2. I have no sides. I am the shape of a ball or a wheel. What am I?</p>	<p>You are a _____.</p> <p>A drawing of the shape:</p>
<p>3. Some people confuse me for a square. I have four sides like a square, but my sides are not all the same length. What am I?</p>	<p>You are a _____.</p> <p>A drawing of the shape:</p>
<p>4. I have four sides. I look like a square sideways. I am usually the main shape on rings. What am I?</p>	<p>You are a _____.</p> <p>A drawing of the shape:</p>
<p>5. I don't have any straight sides. I usually am a symbol for love. I have two humps and a pointed bottom. What am I?</p>	<p>You are a _____.</p> <p>A drawing of the shape:</p>
<p>6. I have four sides that are all the same length. I get confused with rectangles a lot. What am I?</p>	<p>You are a _____.</p> <p>A drawing of the shape:</p>
<p>7. I am similar to a circle. I am a lot wider and flat than a circle. I have no sides. What am I?</p>	<p>You are a _____.</p> <p>A drawing of the shape:</p>



# LESSON PLAN #2

## SORTING AND CLASSIFYING

### **CONCEPT TO BE LEARNED:**

The concept that this activity will reinforce will be the ability to identify shapes and be able to sort and classify objects based on their colors, shape, and size

### **RATIONALE:**

The purpose of this activity is to reinforce the idea of shapes. It is intended to help students understand and comprehend the different characteristics of objects and to be able to sort and classify them into different groups or categories.

### **UNIT OUTCOMES:**

- Identify basic shapes
- Understand and identify characteristics of basic shapes
- Classify objects into like groups or categories
- Be able to explain similarities and differences between shapes

### **ACTIVITY OBJECTIVES:**

- The students will be able to identify basic shapes
- The students will be able to identify similar characteristics between objects and sort them into like categories or groups
- The students will be able to identify a group "name" and find objects that would fit into that particular group
- The students will be able to listen to and follow directions carefully
- The students will be able to work together as a class and respect their peers

### **TIME ALLOTTED FOR ACTIVITY:**

30 minutes

### **MATERIALS NEEDED:**

- Shape flashcards
- Various objects around the classroom (toys, games, office supplies, books, etc.)

### **INTRODUCTION:**

I will start the activity by reviewing shapes and different characteristics of shapes. I will present the shape flash cards and have the students name the shape and how many sides each shape has. I will then present multiple flash cards and ask the students to find similarities; this will initiate classifying and grouping. (10 minutes)

**ACTIVITY PROCEDURE:**

- I will explain to the students that they can sort and classify objects into groups. I will then tell the students that I would like them to find me an object that is square. Once they bring their objects back to their seat, I will then ask them how else we can sort these objects. (size, color, uses of object) I will repeat this process with a circle and triangle so the students become familiar and comfortable with sorting.
- I will then have the students gather 3-5 objects around the room. I will then present different groups that the objects can be sorted or classified in. The students will figure out if any of their objects fits the needs and characteristics of each group. The students will raise their hand and explain why their object fits into each category.
- Once finished, I will have the students return their objects five at a time to avoid "traffic". (20 minutes)

**HIGHER LEVEL QUESTIONING:**

- What are different ways we can classify and sort objects?
- If given a truck, a train, a car, and a bicycle.. what would be the group title that these objects would be classified in?

**ASSESSMENT:**

I will do basic observations throughout the activity. I will be able to observe the students and identify if anyone is struggling. I will also do tallying throughout also. For example, I will tally how many students had circles, squares, etc. in their group of objects.

# LESSON PLAN #3

## CREATING PATTERNS

### **CONCEPT TO BE LEARNED:**

The skill that this activity introduces and reinforces is the concept of identifying patterns and being able to create patterns.

### **RATIONALE:**

The purpose of this activity is to verify the students' ability to identify and create patterns. Patterns are used throughout mathematics in a variety of ways. It is important to make sure the concept is understood and comprehended before more complex problems arise.

### **UNIT OUTCOMES:**

- Understand and comprehend the concept of patterns
- Be able to create patterns
- Use knowledge and application strategies to complete patterns

### **ACTIVITY OBJECTIVES:**

- The students will be able to identify basic shapes
- The students will be able to use shapes to create patterns
- The students will be able to recognize patterns
- The students will be able to analyze characteristics of patterns
- The students will be able to use shapes to create patterns
- The students will be able to listen to and follow directions carefully
- The students will be able to work independently on assigned tasks

### **TIME ALLOTTED FOR ACTIVITY:**

30-35 minutes

### **MATERIALS NEEDED:**

- Mini shapes
- Shape flashcards
- Pattern worksheet (Worksheet #2)

### **INTRODUCTION:**

I will begin this activity by placing the shape flashcards in a pattern. I will explain to the students the different ways we can make patterns (Color, shapes, designs, etc.) I will show multiple patterns and ask the students to identify the pattern. (10 minutes)

**ACTIVITY PROCEDURE:**

- I will explain to the students that we will be using the mini shapes to create patterns. Each student will receive a handful of shapes.
- The students will be encouraged to create patterns. I will walk around the classroom as the students are doing this and prompt questioning:
  - What would come next?
  - What is the pattern you're creating? (10-15 minutes)
- After spending about 15 minutes allowing the students to create patterns, they will then complete a pattern worksheet independently. I will read the directions so that the students who have fluency issues are able to comprehend the directions. (10-15 minutes)

**HIGHER LEVEL QUESTIONING:**






- What are the different forms of patterns we can look for? (Colors, sizes, numbers, etc.)
- Can you create a pattern using words?
- Can you create a pattern using numbers?

**ASSESSMENT:**

I will use observations as an assessment to this activity. By prompting questions while students create patterns, I will be able to identify if the students are comprehending the concept of patterns. I will also use the worksheet as an assessment tool to help me identify any problems or concerns with the concept.

# PATTERNS

**DIRECTIONS:** Complete the patterns.

	_____/_____/_____/_____
	_____/_____/_____/_____
	_____/_____/_____/_____
	_____/_____/_____/_____
	_____/_____/_____/_____

**DIRECTIONS:** Create patterns using the given characteristics

1. Create a pattern of color

2. Create a pattern of size

3. Create a pattern of shapes

## SUBUNIT #1—SHAPES AND PATTERNS POST ASSESSMENT

The following post assessment will be given the day after the final activity of the subunit is presented. The post assessment will cover all topics that were learned regarding shapes and patterns. It will be read orally by the teacher so that the students who have difficulty with fluency can fully comprehend the questions.

# SUBUNIT #1—SHAPES AND PATTERNS

## POST ASSESSMENT

NAME: \_\_\_\_\_

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**DIRECTIONS:** Color the following shapes the correct color.

**SQUARE—BLUE**

**CIRCLE—RED**

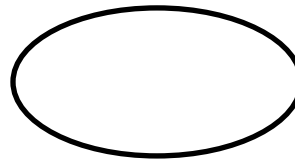
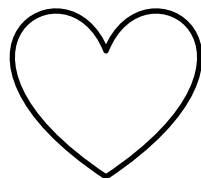
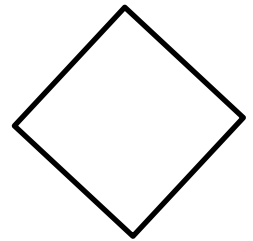
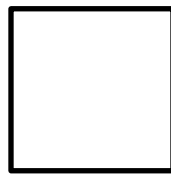
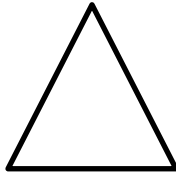
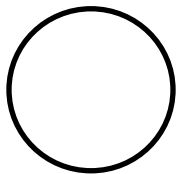
**RECTANGLE—GREEN**

**TRIANGLE-YELLOW**

**DIAMOND—ORANGE**

**HEART—PINK**

**OVAL—PURPLE**

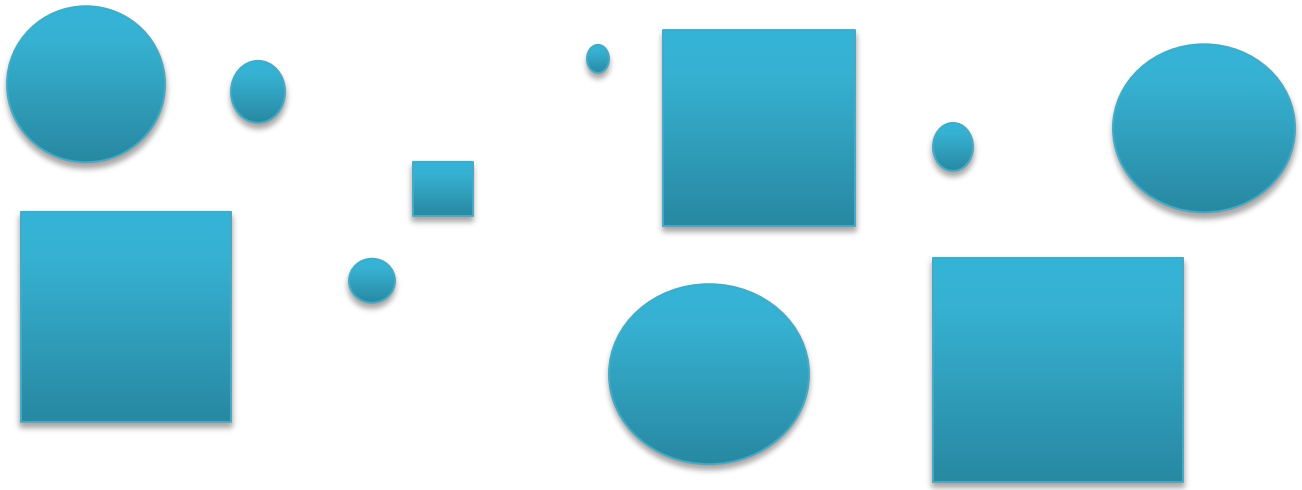


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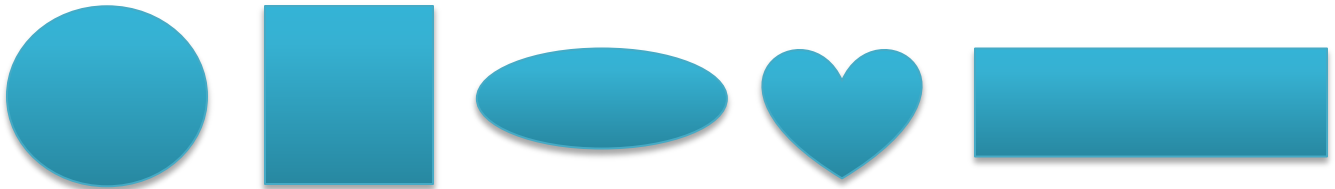
**DIRECTIONS:** Read the following riddles. Write the name of the shape that each riddle is describing. Use the shape words above to help with spelling.

1. I have three sides and I am the same shape as pizza slices. \_\_\_\_\_
2. I have four EQUAL sides. \_\_\_\_\_
3. I have no sides. I am the same shape as a ball or lollipop. \_\_\_\_\_
4. I have no sides. I have two humps and a point instead. \_\_\_\_\_
5. I am flat with not sides. I am the same shape as an egg. \_\_\_\_\_
6. I have four sides. I look like a sideways square. \_\_\_\_\_
7. I have four sides and two of them are longer than the others. \_\_\_\_\_

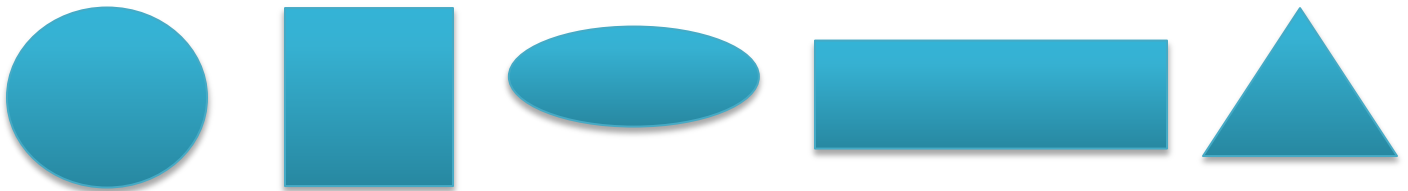
**DIRECTIONS:** Sort the following shapes by circling all the objects that are small.



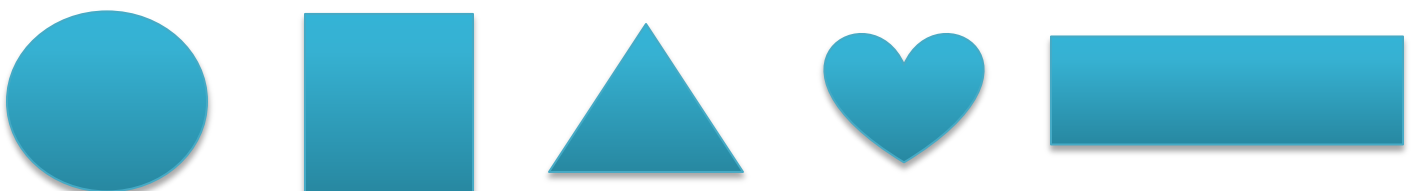
**DIRECTIONS:** Sort the following shapes by circling all the objects that have no sides.



**DIRECTIONS:** Sort the following shapes by circling all the objects that have four sides.


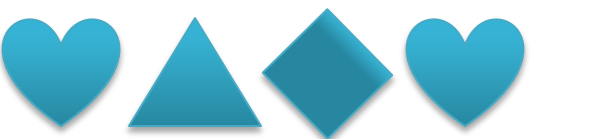
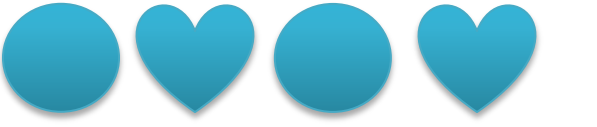



**DIRECTIONS:** Sort the following shapes by circling all the shapes that have three sides.





**DIRECTIONS:** Complete the patterns.

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**DIRECTIONS:** Draw four patterns of your own. Briefly explain what your pattern is.  
Example: A pattern of color/shape/size. Try your best with spelling!

**DIRECTIONS:** Read the following group of objects. Decide how you would group them together. For example.. Car, Train, Bus---Types of Automobiles

1. Apple, fire truck, and stop sign. \_\_\_\_\_

2. Cheese, a slice of pizza, and a triangle. \_\_\_\_\_

3. A dog, a cat, and a horse. \_\_\_\_\_

**Score:** \_\_\_\_\_