

# MATHEMATICAL REASONING AND NUMBER SENSE FOR PRESCHOOL

**Grade Level:** Pre-K

**Presented by:** Paula K. Lane, Star City Child Development, Star City, AR

**Length of Unit:** On going classroom practices

## I) ABSTRACT

A) Teachers of preschool children have a unique opportunity to make a positive and long lasting impact on what young children learn. It is important that preschool children begin to learn counting and number skills in a way that is both instructionally effective and enjoyable. This unit describes a variety of ways that activities can be incorporated into a preschool classroom. Some of the ideas will come from *Number Worlds Math Program, Preschool Level* (Griffin and Case, 2000): Object Land, Picture Land, Line Land, Sky Land, and Circle Land.

## II) OVERVIEW

A) Concept objectives:

- (1) Build counting and number skills
- (2) Sort and classify objects of pictures of objects
- (3) Work quantitatively with concrete objects and pictures

B) Content from Core Knowledge Sequence:

- (1) Identify pairs of objects or images as same or different.
- (2) Establish the use of mathematical language and symbols to describe, compare, and perform mathematical operations.
- (3) Extend quantitative understanding to groups of objects beyond four.

C) Skills to be taught in the unit:

- (1) Sort and classify objects or pictures of objects.
- (2) Duplicate and continue linear patterns.
- (3) Perceive and recognize shapes.
- (4) Use measurements skills and seriate.
- (5) Quantify groups of objects.
- (6) Compare written numerals.

## III) BACKGROUND KNOWLEDGE

A) Teachers:

- (1) *Core Knowledge Preschool Sequence*, Charlottesville, VA: Core Knowledge Foundation
- (2) Griffin, S. & Case, R. *Number Worlds Math Program*, Durham, NH: Number Worlds Alliance, Inc., 2000.
- (3) Fromboluti and Rinch. *Early Childhood: Where Learning Begins Mathematics*, 1999

B) Students:

- (1) Develop counting skills.

## IV) RESOURCES

A) Materials:

- (1) Sorting chips (Mixture of four primary colors)
- (2) One large container
- (3) Attribute blocks or pattern cards

- (4) Attribute blocks or cards with shapes
- (5) Ruler
- (6) Measuring tape
- (7) Counting bears
- (8) Scales (balancing)
- (9) Ice
- (10) Dollar bill
- (11) 50 pennies
- (12) Warm water
- (13) Paper
- (14) Color markers or crayons
- (15) Container for water
- (16) Beaker

V) **Lessons** : Formal lessons will occur during small group and circle time. Informal lessons will occur during transition, center time and outdoor play.

A) **Lesson One** : Sort and classify objects or pictures of objects

(1) Objective:

- 1. Students will be able to sort and classify objects (by color) or picture of objects.

(2) Materials:

- 1. Sorting chips (mixture of four primary colors)
- 2. One large container

(3) Prior Knowledge:

- 1. Assess prior knowledge by having students identify each of the four primary colors in the container.

(4) Key Vocabulary:

- 1. Same
- 2. Different
- 3. Red
- 4. Green
- 5. Yellow
- 6. Blue
- 7. Circle
- 8. How many
- 9. Count
- 10. One
- 11. Two
- 12. Three
- 13. Four
- 14. Container

B) Procedures \ Activities:

(1) Sort chips by color.

- 1. The teacher may work with a small group or a large group of children.
- 2. The teacher will fill a container with playing chips. There should be enough for each child in the group to make a set of four.
- 3. The teacher will then assign each child in the group a different color (the teacher may need to give them a piece of paper with their color on it for a guide).
- 4. Have children take turns taking a chip out of the container that matches their color.

5. After the children have sorted all of the chips, have them count their chips one at a time.
6. The teacher will write the numerals as the children count out loud.
7. The teacher will compare the written numeral with the number of chips.
8. Have all children count as they replace the chips back into the container.

C) Evaluation \ Assessment:

- (1) Observation data is collected both on a classroom checklist. This will be shared with parents at the parent conference. This activity will be continued until the child has mastered the skill.

D) **Lesson Two:** Duplicate and continue linear patterns (K)

(1) Objective:

1. Students will be able to duplicate a pattern of 6-10 concrete objects in which one property, color, shape, or size is alternated.

(2) Materials:

1. Attribute blocks or pattern cards

(3) Prior Knowledge

1. Assess prior knowledge by having students identify the colors and shapes of the attribute blocks.

(4) Key Vocabulary:

1. Color
2. Shape
3. Size
4. Red
5. Yellow
6. Green
7. Blue
8. One
9. Two
10. Three
11. Four
12. Five
13. Six
14. Seven
15. Eight
16. Nine
17. Ten

(5) Procedures \ Activities

1. Show students the attribute blocks and discuss the colors and shapes.
2. The teacher will then give each student ten attribute blocks.
3. The teacher will make a pattern using between 6-10 attribute blocks.
4. The teacher will then ask the students to duplicate the teacher's pattern.
5. Each child will be asked to tell the colors and shapes in their pattern.
6. The children will be asked to count out loud the number of blocks in their pattern.
7. The teacher will record how many attribute blocks the students have on a graph.
8. The teacher will reinforce by counting out aloud the numbers on the graph.

(6) Evaluation \ Assessment:

1. Observation data is collected on a classroom checklist. This will be shared with the parents at the parent conference. Activities will be continued until the child has mastered the skill.

E) **Lesson Three:** Perceive and Recognize shapes

(1) Objective

1. Students will be able to recognize the four basic shapes and match to shapes that are the same configuration and size.

(2) Materials:

1. Attribute blocks
2. Cards with shapes

(3) Key Vocabulary:

1. Rectangle
2. Square
3. Circle
4. Triangle
5. Same size
6. Different size
7. Match

(4) Procedures \ Activities:

1. Match the shapes.
2. The teacher will place the shape cards and attribute shapes on the table.
3. The teacher will give each student ten attribute blocks.
4. The teacher will put the shape cards in the middle of the table. The students will draw one card, and then they will place the matching attribute block on top of the card.
5. The teacher will direct this activity until all cards are drawn.
6. The teacher and students will then look at their sets to see if they are all correct.
7. The students will then be instructed to count to see how many matches they have.
8. The teacher will record each student's matches on a bar graph.
9. The teacher will use the language "same size" and "same shape" as she/he is reviewing.

(5) Evaluation \ Assessment

1. Observation data will be collected on the classroom checklist. This will be shared with the parents at the parent conference. This activity will be continued until the student has mastered it.

F) **Lesson Four:** Use simple measurement skills

(1) Objective

1. The student's will be able to measure objects with the guidance of the teacher.

(2) Material:

1. Ruler
2. Measuring tape
3. Counting bears
4. Balancing scales
5. Ice
6. Dollar bill
7. 50 pennies

8. Warm water
  9. Book
  10. Paper
  11. Color markers or Crayons
  12. Container for warm water
  13. Beaker
- (3) Prior Knowledge:
1. Assess prior knowledge by asking students to show how they would find length, height, size, width, volume, mass, and temperature.
- (4) Key Vocabulary:
1. Length (long or short)
  2. Height (tall or short)
  3. Size (large, small, thick, or thin)
  4. Width (narrow or wide)
  5. Volume (full or empty)
  6. Mass (heavy or light)
  7. Temperature (hot or cold)
  8. Scales
  9. Measurement
- (5) Procedures \ Activities
1. “Do you know how to measure?”
  2. The teacher will start with a small group of students (4-6). These students will work as a team.
  3. The teacher will make a bar graph using the vocabulary, length, height, size, width, volume, mass, and temperature.
  4. Each child will then be given a chance to predict where he or she thinks each object will go on the graph.
  5. The teacher will graph the students’ predictions.
  6. The teacher will then let the students’ take the scales, ruler, measuring tape, beaker, and work as a group to measure each object.
  7. The teacher will then discuss their findings and make a new graph and compare the two.
- (6) Evaluation \ Assessment
1. Observation data will be collected on the classroom checklist and shared with the parents at the parent conference. Students will continue working on this activity until it has been mastered.