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| Instructional Design |
| Rebecca Lindner |

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**Rationale**

The Problem:

Working in an urban setting, something that is often discussed but rarely solved is the achievement gap. Kindergarteners frequently enter our school with a deficit of skills necessary to be successful in school. “The study, Inequality at the Starting Gate, shows that before entering kindergarten, the average cognitive scores of preschool-age children in the highest socioeconomic group are 60 percent above the average scores of children in the lowest socioeconomic group” (Klein and Knitzer, 2006, p. 10).

Therefore, children living in poverty are in greater need of a high-quality preschool program than other children. Having a preschool program during the summer prior to scholars entering kindergarten would expose them to many of the skills they currently enter kindergarten lacking. While there are many elements to a high-quality preschool program, the focus for this curriculum design will be preschool math skills.

Needs of the Learner:

4- and 5-year-old children in an urban setting frequently have no prior school experience when entering kindergarten. Klein and Knitzer (2006) highlight the importance of having a high-quality preschool program, “although all young children are born ready to learn, many low-income children fall behind early and remain very much behind their peers in reading and math. Success in narrowing this achievement gap depends on providing young children with specific knowledge in preschool curricula before they start kindergarten” (p. 13). In order to even think about closing the achievement gap, we must first provide a high-quality preschool program. Focusing on math is critical for these children because the school they will attend in kindergarten feeds into an entrepreneurship-focused college-preparatory school. Having a strong foundation in mathematical skills is imperative for their future success.

While math is the focus of this curriculum design, social and emotional needs must be met as a part of a comprehensive, high-quality program. Klein and Knitzer (2006) suggest an intentional curriculum to meet these needs, “An intentional curriculum addresses both social and regulatory skills in addition to academic skills” (p. 17).

Needs of the Society:

Scholars need a strong foundation in math. Each morning, our scholars promise to strive for middle school, high school, and college success. It is critical that the curriculum sets them up for success. Moreover, in order to be a successful member of society, one needs basic math skills. It is impossible to get to a job interview on time if you can’t tell time or if you can’t count how much money you need to pay for bus fare. In addition, almost every career requires at least rudimentary math skills. According to Boaler (2008), “The United States is rapidly falling behind the rest of the developed world in terms of math education, and the future of our economy depends on the quality of teaching that our children receive today.” It is imperative that scholars have a sound foundation in math.

Value of the Subject Matter:

Math is used frequently in everyday life. The skills taught in preschool math are vital for all future math work. Quality math instruction teaches problem-solving skills which is significant in all school subjects and in life. All preschool math concepts build into vital life skills in the future.

The Educational Goal:

This course is designed to teach scholars the prerequisite skills needed for kindergarten math. This will ultimately help to close the achievement gap and ensure that these scholars have the basic math skills they need for kindergarten and beyond. The course will provide hands-on learning opportunities as well as problem-solving practice.

Lesson Plan Model:

The basic lesson planning model referenced on page 90 of *Curriculum in Context* will be utilized for this unit. The basic lesson plan allows for flexibility in teaching style and activities, both of which are necessary for teaching preschoolers.

**Measurable Sub-Unit Learner Outcomes**

**Number Sense**

* Scholars will be able to (SWBAT) count to 20 by ones. (Knowledge)
* SWBAT identify and name numerals 1-9. (Knowledge)
* SWBAT identify without counting small quantities of objects up to three items. (Knowledge)
* SWBAT demonstrate one-to-one correspondence when counting objects up to 10. (Comprehension)
* SWBAT explain that the last number spoken tells the number of objects counted. (Evaluation)
* SWBAT identify whether the number of objects in one group is greater than, less than or equal to the number of objects in another group up to 10. (Knowledge)

**Pre-Assessment**

Pre-assessment will take place in the form of an observational checklist administered by the teacher. This will be performed in an informal setting, based upon teacher observations.

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| Name: | Date: |  |
| Skill | Can scholar perform skill?  (Yes, No, Not Observed) | Observational Notes |
| Can scholar count to twenty by ones? |  |  |
| Can scholar identify and name numerals 1-9? |  |  |
| Can scholar identify without counting small quantities of objects up to three items? |  |  |
| Can scholar demonstrate one-to-one correspondence when counting objects up to 10? |  |  |
| Can scholar explain that the last number spoken tells the number of objects counted? |  |  |
| Can scholar identify whether the number of objects in one group is greater than, less than or equal to the number of objects in another group up to 10? |  |  |

**Lesson Plans**

**Number Hunt  
(Note: This lesson will be repeated twice- once with numerals 1-4, and once with numerals 5-9).**

1. **Content:** Identify and name numerals 1-9.
2. **Lesson Objective:** Scholars will be able to find, identify and name numerals 1, 2, 3 and 4.
3. **Procedures:**
   1. **Introduction (5 min.)**
      1. Say, “Today, we’re going to be detectives! We’re going to find numbers all around our classroom. We’re going to count objects and find the numerals, which is the word for how we write numbers down.”
      2. Say, “Let’s practice our numbers 1-4!”
      3. Write on the whiteboard the numerals 1, 2, 3, and 4.
      4. Have children help you count and draw an appropriate number of objects for each numeral.
   2. **Developmental Activity (15 min.)**
      1. Give each child an index card with dots on it. The child needs to count the dots and look for the correct numeral. When he/she finds the correct numeral, he/she needs to write the numeral on the card. Each child should continue working and hunting until he/she has completed numerals 1, 2, 3 and 4.
      2. Once children have found each of the numerals, they should all return to the carpet.
   3. **Concluding Activity (5 min.)**
      1. Have children share items in the classroom that they can count using the same numerals they found (for example: 2 legs on each person or 4 legs on a chair.)
4. **Assessment/Evaluation Strategy**
   1. Teacher will keep informal notes on the observational checklist.
5. **Materials/Resources**
   1. 1 set of index cards for each child- 1 card with 1 dot, 1 card with 2 dots, 1 card with 3 dots, and 1 card with 4 dots.
   2. Sheets of paper hung around the room with 1 numeral on each sheet (numerals 1-4 only).
   3. Pencils for each child.

**Sensory Art  
(Note: This lesson will be repeated twice- once with numerals 1-4, and once with numerals 5-9).**

1. **Content:** Identify and name numerals 1-9.
2. **Lesson Objective:** Scholars will be able to create numerals 1, 2, 3 and 4.
3. **Procedures:**
   1. **Introduction (5 min.)**
      1. Say, “Today, we’re going to make number art!”
      2. Say, “Remember yesterday and the day before when we found the numbers 1-9? Today, we’re going to make the numbers 1-4 and tomorrow we’ll make the numbers 5-9!”
      3. Say, “We’re going to write the number, paint it with glue, and then we’re going to pour glitter, dirt, or sand on top to make the number!”
   2. **Developmental Activity (15 min.)**
      1. Give each child a sheet of white paper and a thick black marker.
      2. Have them draw the numeral 1 on the paper.
      3. Give each child a paintbrush and glue. Have him/her pain over the numeral with glue.
      4. Allow each child to sprinkle their desired material over the glue. Shake off excess material.
      5. Hang paper to dry and repeat the process for numerals 2-4.
   3. **Concluding Activity (5 min.)**
      1. Once art is dry, have children draw a corresponding number of objects on the paper.
      2. Children can trace the sensory number with their finger to practice.
4. **Assessment/Evaluation Strategy**
   1. Teacher will keep informal notes on the observational checklist.
5. **Materials/Resources**
   1. 4 sheets of paper for each child.
   2. Thick black marker for each child.
   3. Glue in cups.
   4. Paintbrush for each child.
   5. Materials in tubs for sprinkling over the glue (glitter, dirt, sand).

**Sort and Count**

1. **Content:** Identify and name numerals 1-9.
2. **Lesson Objectives:** 
   1. Scholars will be able to count up to 9 objects.
   2. Scholars will be able to match numbers of like objects to numerals.
3. **Procedures:**
   1. **Introduction (5 min.)**
      1. Say, “Today, we’re going to play a sorting and counting game!”
      2. Say, “What are some ways we can sort objects?” (Possible responses: color, size, shape) “Today, we will be sorting by color! We’ll sort objects by color, then count them, then match them with the numbers we’ve been practicing all week.”
   2. **Developmental Activity (15 min.)**
      1. Give each child a sorting kit.
      2. Allow time for children to sort, count and match the numerals. Discuss why they chose the numeral that they chose.
   3. **Concluding Activity (5 min.)**
      1. Have children evaluate each other’s work, checking for accuracy.
4. **Assessment/Evaluation Strategy**
   1. Teacher will keep informal notes on the observational checklist.
5. **Materials/Resources**
   1. Sorting tub for each scholar containing:
      1. 9 different colored squares of fabric
      2. Foam numerals 1-9
      3. Color coordinated objects, 1-9. (Example, 1 red feather, 2 blue feathers, 3 green feathers etc.)

**Post-Assessment**

While the pre-assessment will be given in an informal setting, the post-assessment will occur one-on-one with a teacher, in a formal setting.

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| Name: |  |  |  | Date: |  |
| Skill | Materials | Prompt | Correct Responses | Can scholar perform skill?  (Yes, No) | Observational Notes |
| Can scholar count to twenty by ones? | None | “Count to twenty, starting at one.” | Scholar counts from one to twenty by ones, in correct order. |  |  |
| Can scholar identify and name numerals 1-9? | Cards with numerals 1-9 written. | 1. Present numerals in random order, one at a time. “Name this number.” 2. Lay out all numerals. Call out numerals one at a time. “Find the number 3. Find the number 5.” Etc. | Scholar was able to correctly identify / find the numeral. | |  |  | | --- | --- | | Numeral | Identify? | | 1 |  | | 2 |  | | 3 |  | | 4 |  | | 5 |  | | 6 |  | | 7 |  | | 8 |  | | 9 |  |  |  |  | | --- | --- | | Numeral | Find? | | 1 |  | | 2 |  | | 3 |  | | 4 |  | | 5 |  | | 6 |  | | 7 |  | | 8 |  | | 9 |  | |  |
| Can scholar identify without counting small quantities of objects up to three items? | Sets of objects ranging from one object to three objects | Present objects in random order. “Without counting, how many objects are in this group?” | Scholar should correctly name the number of objects without counting. | |  |  | | --- | --- | | Number of objects | Identify? | | 1 |  | | 2 |  | | 3 |  | |  |
| Can scholar demonstrate one-to-one correspondence when counting objects up to 10? | Counters | Present scholar with random number of objects (up to ten). “Count these objects. Touch them when you count.” | Scholar should correctly count the number of objects, touching each one as they count. |  |  |
| Can scholar explain that the last number spoken tells the number of objects counted? | Counters from previous question | “When you counted before, how did you know how many there were? | Scholar should explain that the last number spoken tells the number of objects (or similar explanation) |  |  |
| Can scholar identify whether the number of objects in one group is greater than, less than or equal to the number of objects in another group up to 10? | Counters from previous questions, new sets of counters (1 greater than, 1 less than, 1 equal to) | Show each set of counters separately. “Is this group of counters greater than, less than or equal to the counters we already counted?” | Scholar can correctly identify whether the number of objects in the new group is greater than, less than or equal to the counters in the original group. | |  |  | | --- | --- | | Describer | Identify? | | Greater than |  | | Less than |  | | Equal to |  | |  |

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