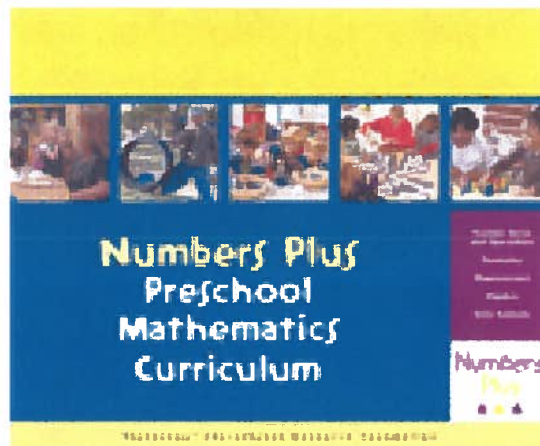


Numbers Plus



*"Numbers Plus, a content-rich curriculum of primarily small-group activities, is sequenced *within* activities, rather than across. Each math activity is created so that children of all developmental and ability levels can share in the activity and each child can have a successful and valuable learning experience."*¹

¹ Numbers Plus Teacher's Manual, p. 7



Scope

The scope of Numbers Plus, as noted previously, is the five areas that are aligned with the NCTM content standards. Each content area covers between two and five topics, and each topic details the skills and concepts that young children are learning as they explore materials and investigate ideas. (See Numbers Plus Content Areas & Topics sidebar, p. 5; see Chapter 2, "Curriculum Content and Teaching Strategies" for definitions and a list of the skills and concepts children learn within each topic.)

Sequence

Each Numbers Plus activity is sequenced so children of different developmental and ability levels can participate together while having an enjoyable and successful learning experience. Educators agree that early math learning is sequential; that is, children must acquire certain foundational knowledge and skills before proceeding to the next level, as in the following examples:

- A child must count with one-to-one correspondence (enumerate) before doing addition and subtraction.
- Recognizing simple shapes (triangle, rectangle, circle) precedes combining them into complex shapes.
- Understanding the concepts of longer and shorter comes before measuring and comparing two or more lengths.

Successful Sequencing for All Children

Sequencing early mathematics learning within (not across) activities is effective because it

1. Acknowledges the diversity of young children's developmental and ability levels. Teachers maximize each child's potential to engage at his or her own level by accommodating strategies to children, rather than expecting children to adjust to the activities. Conversely, in a fixed sequence, a teacher may proceed to a higher-level activity before all children have mastered concepts from an earlier activity. The children who have not mastered the concepts will be further lost during each successive activity.

2. Encourages children to learn from peers. Mixed developmental and ability groups allow children to learn from their classmates. Children are challenged when they have to make sense of discrepancies between their own conclusions and those of their peers. Having to explain their reasoning to others also encourages children to think about and articulate their thought processes.

3. Accommodates different needs for practice. In all content areas, children need different levels of practice to master or internalize a skill or concept. If the group advances to the next

activity, even a child who appears to understand an earlier task may need to stay at the same level for a while. Sequencing within activities accommodates such differences in pacing, while follow-up and related activities provide additional opportunities for practice.

4. Recognizes day-to-day variations in interest and attendance. On any given day, a child may not be interested in the topic addressed or may be absent. Teachers need the flexibility to use what the child is interested in as a springboard for meaningful engagement with some component of math. They also need a mechanism for engaging children who may have missed one or more math activities entirely. Sequencing within activities provides this flexibility.

5. Guarantees all children will have a positive and meaningful learning experience. Early childhood educators, and teachers in the later grades, all want young children to develop a positive attitude toward mathematics. By providing children with engaging and successful math experiences from the outset, we help them gain confidence and remain engaged with the subject.

Math curricula differ, however, on how they accomplish this sequencing. One way is to carry out activities in a fixed order; that is, the curriculum is sequenced *across* activities. In this type of curriculum, every child is expected to participate in the same activity at the same time in the same way, moving through the sequence. Sequencing across activities is the model typically found in math programs for young children. The disadvantage of this fixed sequence, however, is that a teacher may move on to the next level of activity before all the children have mastered the concepts of the earlier activity. With each successive activity, it becomes increasingly difficult for these children to keep up.

A second, more effective option is to sequence learning and instruction *within* each activity. In this method, children at all levels participate together in the same activity, but they engage with the materials and ideas according to their own knowledge and skills. Teachers individualize instruction to *scaffold* (support and extend) each child's learning. Children also observe and learn from one another.

Numbers Plus, a content-rich curriculum of primarily small-group activities, is sequenced *within* activities, rather than across. Each math activity is created so that children

of all developmental and ability levels can share in the activity and each child can have a successful and valuable learning experience. Each Numbers Plus activity includes a detailed table with examples of what children at early, middle, and later developmental levels may say and do and also provides strategies teachers can use to support children at these different levels. While a few activities build on prior ones, most can be done in any order. At the end of each activity, ideas for follow-up and related Numbers Plus activities also allow children to continue progressing along the continuum of early math learning. (For more information on the effectiveness of sequencing within activities, see Successful Sequencing for All Children sidebar, p. 7.)



Active Participatory Learning

Embedded in the teaching strategies of Numbers Plus are five principles of **active participatory learning**: materials, manipulation, choice, child language and thought, and adult scaffolding. These principles, which are the foundation of the HighScope Curriculum (Epstein, 2007; Hohmann, Weikart, & Epstein, 2008) and the basis of all good developmental practice, are also consistent with the five NCTM process standards. They reflect how young children learn and which instructional practices adults can use to support and extend that learning.

The first three principles (materials, manipulation, and choice) describe the types of learning opportunities adults provide to children. The fourth (child language and thought) encourages teachers to observe what children do and say to identify their developmental level. The fifth principle (adult scaffolding) describes what educators typically think of as “teaching,” that is, what adults do and say. Many curriculum models focus on only the teachers’ role, without first giving them strategies to understand children’s development and adapt their practices to maximize individual learning. Numbers Plus does both.

Materials. Active learning programs offer young children an abundant supply of diverse, age-appropriate materials. Taken as a whole, these materials appeal to all the senses and are “open ended.” They lend themselves to being used in a variety of ways and help to expand children’s experiences and stimulate their thought. Because preschoolers primarily deal with the world in concrete terms, materials help them pose and answer math questions, for example, sorting and counting collections to determine which group has more.

Manipulation. Active participatory learning means children handle, examine, combine, and transform materials and ideas. They make discoveries through direct hands-on and “minds-on” contact with these resources. Preschoolers are beginning to develop mental representations of objects and actions (forming images in their minds). Yet they still need to handle materials to experience their properties and see how their actions bring about change, for example, discovering that two triangles can be rotated and combined to make a rectangle.

Preparing for the Activity



- Before the children arrive:
 - Gather sets of materials for each child and adult.
 - Have the materials all ready to go.
 - Read through your selected activity again.



28 Numerals in Newspapers

Children will enjoy finding numerals in newspapers, and they will learn to identify numerals in a variety of contexts.

Time of day: 1 hour
Suggested earlier activities: None

Content Area: English
Number Sense & Symbolic Operations

Materials

- Materials for each child and teacher:
 - Newspaper advertisements containing large numerals (e.g., 100, 200, 300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200, 1300, 1400, 1500, 1600, 1700, 1800, 1900, 2000, 2100, 2200, 2300, 2400, 2500, 2600, 2700, 2800, 2900, 3000, 3100, 3200, 3300, 3400, 3500, 3600, 3700, 3800, 3900, 4000, 4100, 4200, 4300, 4400, 4500, 4600, 4700, 4800, 4900, 5000, 5100, 5200, 5300, 5400, 5500, 5600, 5700, 5800, 5900, 6000, 6100, 6200, 6300, 6400, 6500, 6600, 6700, 6800, 6900, 7000, 7100, 7200, 7300, 7400, 7500, 7600, 7700, 7800, 7900, 8000, 8100, 8200, 8300, 8400, 8500, 8600, 8700, 8800, 8900, 9000, 9100, 9200, 9300, 9400, 9500, 9600, 9700, 9800, 9900, 10000, 10100, 10200, 10300, 10400, 10500, 10600, 10700, 10800, 10900, 11000, 11100, 11200, 11300, 11400, 11500, 11600, 11700, 11800, 11900, 12000, 12100, 12200, 12300, 12400, 12500, 12600, 12700, 12800, 12900, 13000, 13100, 13200, 13300, 13400, 13500, 13600, 13700, 13800, 13900, 14000, 14100, 14200, 14300, 14400, 14500, 14600, 14700, 14800, 14900, 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86500, 86600, 86700, 86800, 86900, 87000, 87100, 87200, 87300, 87400, 87500, 87600, 87700, 87800, 87900, 88000, 88100, 88200, 88300, 88400, 88500, 88600, 88700, 88800, 88900, 89000, 89100, 89200, 89300, 89400, 89500, 89600, 89700, 89800, 89900, 90000, 90100, 90200, 90300, 90400, 90500, 90600, 90700, 90800, 90900, 91000, 91100, 91200, 91300, 91400, 91500, 91600, 91700, 91800, 91900, 92000, 92100, 92200, 92300, 92400, 92500, 92600, 92700, 92800, 92900, 93000, 93100, 93200, 93300, 93400, 93500, 93600, 93700, 93800, 93900, 94000, 94100, 94200, 94300, 94400, 94500, 94600, 94700, 94800, 94900, 95000, 95100, 95200, 95300, 95400, 95500, 95600, 95700, 95800, 95900, 96000, 96100, 96200, 96300, 96400, 96500, 96600, 96700, 96800, 96900, 97000, 97100, 97200, 97300, 97400, 97500, 97600, 97700, 97800, 97900, 98000, 98100, 98200, 98300, 98400, 98500, 98600, 98700, 98800, 98900, 99000, 99100, 99200, 99300, 99400, 99500, 99600, 99700, 99800, 99900, 100000, 100100, 100200, 100300, 100400, 100500, 100600, 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163200, 163300, 163400, 163500, 163600, 163700, 163800, 163900, 164000, 164100, 164200, 164300, 164400, 164500, 164

An overview of the activity, including title and short description.

The time of day, any suggested earlier NP activities (most are for small-group time, but there are also a few large-group time activities).

A list of the materials you'll need for the activity. Be sure to include enough for each child (and adult) can have their own set! There are also shared materials to be used by everyone. Backup materials might come out part-way through the activity if needed.

28 Numerals in Newspapers

Children search for large numerals in newspaper advertisements and cut them out to make their own number collection.

Time of day: Small-group time
Suggested earlier activity: None

Content Area: Number Sense & Operations
Topics: Number Words & Symbols

Materials

- Materials for each child and teacher**
- Newspaper advertisements containing large numerals (e.g., grocery coupons, sale ads with quantities and prices)
 - Scissors
 - Envelope for keeping numeral collection
- Shared materials:**
- None
- Backup materials:**
- Paper and glue (or tape) for attaching cutout numerals
 - Crayons or markers (children may choose to draw a circle around numerals if they have trouble cutting them out)

The content area and topics that correspond with the activity.

- For children who are having difficulty with scissors, offer them markers to circle the numerals.

End

- Bring in newspaper advertisements to look at and talk about the numerals with their children.
- As you transition to the next activity, encourage children to look for numerals throughout the room.

Beginning

- Ask the children to think of things that have numbers on them (e.g., telephones, books, clocks, sports jerseys). Acknowledge their responses.
- Give each child a newspaper advertising section and scissors. Say *Today you have sheets of newspaper with numbers on them and scissors to cut them out. You might want to make your own number collection.*

Middle



Materials

Materials for each child and teacher:

- Newspaper advertisements containing large numerals (e.g., grocery coupons, sale ads with quantities and prices)

- Scissors

- Envelope for keeping numeral collection

Shared materials:

- None

Backup materials:

- Paper and glue (or tape) for attaching cutout numerals
- Crayons or markers (children may choose to draw a circle around numerals if they have trouble cutting them out)

A suggestion of how to introduce the activity to the children. This is just a starting point! Feel free to adapt these for your own children.

General ideas for what you might do during the middle part of the activity.

Beginning

- Ask the children to think of things that have numbers on them (e.g., telephones, books, clocks, sports jerseys). Acknowledge their responses.
- Give each child a newspaper advertising section and scissors. Say *Today you have sheets of newspaper with numbers on them and scissors to cut them out. You might want to make your own number collection.*

Middle

- Expect the children to engage with the materials at different developmental levels, from simply exploring the advertisements, scissors, and envelopes to using and talking about them in complex ways.
- Name and discuss the numerals children find. Help them identify and differentiate numerals and letters.

End

- Bring the activity to a close by encouraging the children who want to keep their cut numerals to put them in an envelope. (If they choose to bring their envelopes home, tell parents about the activity and encourage them to look at and talk about the numbers with their children.)
- As you transition to the next activity, encourage children to look for numerals throughout the room.



Providing books about numbers is another way to help children recognize printed numerals.

Here's where the developmental range is described.

What children might say or do at an earlier, middle or later stage of development.

Ideas for how adults can scaffold children at the beginning, middle, and later stages of development.

Developmental range: Supporting children at different levels

Earlier

Children may

- Point to a letter and call it a numeral (e.g., *What's this number?*).
- Look at or point to numerals and identify them as numerals (e.g., *Here's a number*).
- Match numerals (e.g., *These two are the same*).

Adults can

- Point out letters and numerals. Say, for example, *Some of these are letters, like the j in your name. These are numbers. They say how many there are of something.*
- Point to a number in the room (e.g., on the clock, in a book) and the same number in the newspaper (e.g., *Look there is a 2 on the clock and here is a 2 in the newspaper — they're the same number*).

Middle

Children may

- Identify numerals (e.g., *I found a 4 and another 4*) but make errors (e.g., point to a 5 and call it a 3).
- Sort and label comparable numerals (e.g., *I'm putting all the 3s in one pile*).
- Relate numerals to familiar objects and events (e.g., *That's a 4 — I'm 4 years old*).
- Search for or find a specific numeral (e.g., *I found a 6 for you*).

Adults can

- Supply numeral names but not correct children (e.g., *Here's one like yours and I call it a 5*).
- Cut out a specific numeral and ask children to find more of that numeral (e.g., *I'm going to cut out all the 2s on this page. Do you see any more?*).
- Ask for specific numerals (e.g., *I need a number 6. Can someone find one for me?*).
- Acknowledge children's association of numerals and other things, and ask them to find numerals related to other objects and events (e.g., *What number is the same as your baby brother's age?*).

Later

Children may

- Line up numerals in order (e.g., *I found 1, 2, 3, and now I need a 4*).
- Identify missing numerals (e.g., *I got a 1, 3, 4, and 5 — I'm still looking for a 2*).
- Say whether a numeral represents a larger or smaller quantity than another numeral (e.g., *There's a 5; it's bigger than a 4*).
- Say by how much one numeral is more or less than another (e.g., *I found a 3 — it's one more than a 2*).

Adults can

- Cut out numerals (0-9) and ask, *Can you help me glue mine in order?*
- Ask, *What number comes after (or before) ____?*
- Line up numerals with a space for a missing numeral and ask what goes there (e.g., 1, 2, 4, 5. *What number is missing?*).
- Say, *I'm looking for all the numbers bigger (or smaller) than ____ . Do you see any?*
- Ask by how many one numeral is bigger or smaller than another.

Materials

Materials for each child and teacher:

- Newspaper advertisements containing large numerals (e.g., grocery coupons, sale ads with quantities and prices)
- Scissors
- Envelope for keeping numeral collection

Ideas for how the adult can bring the activity to a close.

Children may choose to unroll the materials if they have

Beginning

- Ask the children to think of things that have numbers on them (e.g., telephones, books, clocks, sports jerseys). Acknowledge their responses.
- Give each child a newspaper advertising section and scissors. Say *Today you have sheets of newspaper with numbers on them and scissors to cut them out. You might want to make your own number collection.*

Middle

- Expect the children to engage with the materials at different developmental levels, from simply exploring the advertisements, scissors, and envelopes to using and talking about them in complex ways.
- Name and discuss the numerals children find. Help them identify and differentiate numerals and letters.

End

- Bring the activity to a close by encouraging the children who want to keep their cut numerals to put them in an envelope. (If they choose to bring their envelopes home, tell parents about the activity and encourage them to look at and talk about the numbers with their children.)
- As you transition to the next activity, encourage children to look for numerals throughout the room.



Providing books about numbers is another way to help children recognize printed numerals.

Finally, ideas for how you may want to follow up on the activity during other parts of the daily routine **OR** with another Numbers Plus activity.

- more").
- Ask for specific numerals (e.g., 1, 2, 4, 5. *What numeral is missing?*).
- Say, *I'm looking for all the numbers bigger (or smaller) than ____ . Do you see any?*
- Ask by how many one numeral is bigger or smaller than another.
- Acknowledge children's association of numerals and other things, and ask them to find numerals related to other objects and events (e.g., *What number is the same as your baby brother's age?*).

Ideas for follow-up

- Add newspapers to the book area. Encourage the children to bring them to the art area if they want to cut, color, or make a collage with them.
- Provide books with numerals in them.
- As you play alongside the children at work/choice time, point out numerals (e.g., on food packages, clocks, phones, measuring tools).
- *Related activities:* 17. Hickory, Dickory, Dock, 26. Numeral Hopscotch, 27. Numeral Hunt, 29. Numeral Soup

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Ideas for Follow-up



- At your next planning time, look at the ideas for follow-up.
 - How can you follow up on this idea during other parts of the daily routine?
 - Other *Number of the Day* activities?
 - Other ideas that you and your team have?

