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# Practical Strategies for Utilising Instructional Materials in Early Mathematics Education: Perspectives from Teachers in Port Harcourt, Nigeria

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**Abstract**
Early mathematics is most meaningful to young children when number, shape, measurement and spatial ideas are presented through concrete objects that children can see, touch, move, sort and talk about. In many early childhood classrooms in Port Harcourt, however, mathematics is still introduced through copying, recitation and worksheets, while low-cost materials available within the school and home environment are underused. This article presents a practical, teacher-oriented framework for using readily available instructional materials to teach early mathematics in early childhood education. The article adopted a practice-based descriptive methodology, drawing from literature on early mathematics, child development, instructional materials, and classroom realities in Nigerian early childhood settings. The results are presented as a practical utilization guide showing how bottle tops, seeds, stones, sticks, ropes, cartons, paper plates, beads, cups, leaves, pegs and number cards can support counting, sorting, one-to-one correspondence, patterning, addition, subtraction, shapes, measurement, fractions and data representation. The article proposes a five-step utilization model: select the concept, choose safe materials, demonstrate the idea, allow child manipulation, and assess through observation. It concludes that teacher creativity, safety, questioning, classroom organization and assessment are more important than the cost of the material. The paper recommends regular teacher training on locally made mathematics materials, school-based material banks, parental involvement, and quality assurance checks that focus on actual classroom use rather than mere availability of resources.

**Keywords**: Instructional Materials, Early Mathematics, Teacher Strategies, Local Materials, Early Childhood Education

## Introduction

Mathematics begins long before a child enters formal primary school. Young children compare the size of cups, count steps, arrange shoes, share food, identify shapes in the environment, notice patterns in songs and movements, and use words such as more, less, big, small, long, short, full, empty, before and after. These everyday experiences form the foundation for later mathematical thinking. Research on early learning shows that children construct mathematical ideas through active exploration, language, comparison and problem solving, not merely through memorising symbols (Gopnik et al., 2001; National Research Council, 2009). Early mathematics is also important because it predicts later school achievement. Duncan et al. (2007) found that school-entry mathematics skills were among the strongest predictors of later academic performance, while Bernstein et al. (2014) reported that children's skills at school entry provide useful evidence for understanding early learning needs. Similarly, Siegler et al. (2012) showed that early mathematical knowledge predicts later mathematics achievement. These findings suggest that early numeracy should not be treated as a minor part of early childhood education, but as a foundation for later learning.


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In Nigeria, the National Policy on Education recognises early childhood care, development and education as the foundation for smooth transition to primary school, and it requires learning experiences that are developmentally appropriate and activity based (Federal Republic of Nigeria, 2013). The National Association for the Education of Young Children and the National Council of Teachers of Mathematics also recommend that mathematics for young children should be meaningful, coherent, linked to children's experiences and supported by intentional teaching (NAEYC & NCTM, 2010). However, a gap often exists between policy expectations and daily classroom practice. In many early childhood classrooms in Port Harcourt, mathematics instruction is still dominated by number recitation, copying numerals and repeated oral drills. Teachers may ask children to chant "one to one hundred" without confirming whether they understand quantity, one-to-one correspondence or cardinality. Some teachers use worksheets too early, while some keep instructional materials on shelves as decorations. Where materials are available, they may not be connected to clear mathematical objectives. These practices limit children's opportunity to build concepts through manipulation and reasoning.

The challenge is not always the absence of money. Many useful mathematics materials are already available in homes, schools and the immediate community. Bottle tops, seeds, stones, buttons, sticks, leaves, ropes, cups, paper plates, cartons, matchboxes, clothes pegs, egg crates and beads can become powerful mathematics resources when they are safe, clean, well organised and used purposefully. Agina-Obu (2005) described instructional materials as concrete or physical resources that appeal to the senses during teaching and learning. Frye et al. (2013) emphasised that early mathematics instruction should use purposeful activities and materials that help children build understanding through guided practice, classroom routines and meaningful problem-solving. This paper therefore moves beyond the general claim that instructional materials are useful. Its focus is practical: what materials can early childhood teachers use, how can they use them, what mathematics concepts can the materials support, and how can teachers assess whether children are actually learning? The article is situated in Port Harcourt, Nigeria, where many schools operate within limited budgets but have access to recyclable, household and environmental materials. The central argument is that readily available materials can improve early mathematics teaching when teachers select them intentionally, organise them safely, connect them to specific learning outcomes and guide children through mathematical vocabulary. The practical emphasis is necessary because a teacher may have access to materials and still fail to use them productively. Effective use requires planning, safety checks, clear teacher demonstration, child manipulation, questioning, observation and follow-up. When these steps are absent, materials may become classroom decoration rather than learning tools. When they are present, ordinary objects can support counting, comparison, classification, spatial reasoning and mathematical language.

The use of instructional materials in early childhood education has been widely discussed, yet many discussions remain general. Teachers are often told to use materials without being shown how to select, prepare, introduce, manage and assess them during mathematics lessons. As a result, some teachers either avoid materials entirely or use them as play objects without a clear mathematical purpose. In early mathematics, this weakness is particularly serious because young children need concrete experiences before they can understand abstract symbols. When children are pushed to write numerals, memorise operations or complete worksheets without first manipulating real objects, they may appear busy but remain conceptually weak. This can affect later learning in primary school. Therefore, a practical article is needed to translate the idea of instructional materials into classroom strategies that early childhood teachers can use immediately.

The aim of this article is to present practical utilisation strategies for using readily available instructional materials in teaching early mathematics in early childhood education. Specifically, the study sought to:

1. Identify low-cost and readily available materials that can be used for early mathematics teaching;
2. Match common early mathematics concepts with suitable local instructional materials;
3. Explain how teachers can use the materials in child-centred classroom activities;
4. Present a simple teacher utilisation model for planning and assessing material-based mathematics lessons; and
5. Provide recommendations for teachers, school heads, parents and quality assurance officers.


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The literature reviewed covered early childhood mathematics, learning trajectories, child development, instructional materials, concrete manipulatives, teacher questioning, school readiness and early childhood curriculum expectations. It also considered foundational Nigerian and West African texts on educational technology, early childhood education and teaching methods, including Abimbola (1999), Frye et al. (2013), Agina-Obu (2005), Maduewesi (1999), Onasanya (2004), Samuel (2009), and Tamakloe et al. (2005), because the article is concerned with practical classroom use of instructional materials in a Nigerian context. The practical material list was developed from common objects that can be found in schools, homes and communities in Port Harcourt. Materials were included if they met four criteria: they are low-cost or free, safe when properly prepared, easy for young children to manipulate, and capable of representing at least one early mathematics concept. The mathematics concepts selected were counting, one-to-one correspondence, number recognition, sorting, classifying, patterning, comparing, measurement, shapes, spatial awareness, simple addition, simple subtraction, fractions and data representation. The analysis followed four steps. First, common early mathematics concepts were identified from early childhood mathematics literature. Second, each concept was matched with possible local materials. Third, teacher actions were organised into practical lesson stages using ideas from instructional design and teaching-method literature (Gardner, 2010; Tamakloe et al., 2005). Fourth, the proposed strategies were arranged into tables and sample activities that teachers can adapt for classroom use.

**Practical Utilization Guide for Early Mathematics Instructional Materials**

This section presents five practical utilization outputs designed to guide teachers in the effective use of instructional materials for early mathematics teaching. These outputs include a material-concept guide, a five-step utilization model, sample lesson activities, safety and inclusion guidelines, and an assessment checklist.

**Readily Available Materials Can Support Major Early Mathematics Concepts**

The first result is that many early mathematics topics can be taught with low-cost materials. The usefulness of a material depends on how the teacher connects it to a concept. A bottle top can be used for counting, sorting, patterning, addition, subtraction and simple graphing. A rope can be used for measurement, curves, shapes and positional language. Paper plates can be used for circles, fractions and clock activities. The table below presents practical examples.

**Table 1: Readily available materials for early mathematics concepts**

| Mathematics concept | Readily available materials | Teacher utilization strategy | Expected child response |
|---|---|---|---|
| Counting and one-to-one correspondence | Bottle tops, seeds, stones, sticks, buttons | Give each child a small set. Ask the child to touch one object while saying one number word. Vary the arrangement so counting is not based on memorised order. | Child counts objects accurately and understands that the last number tells how many. |
| Number recognition | Number cards, calendar cut-outs, labelled cups | Place number cards beside groups of objects. Ask children to match each card with the correct quantity. | Child links numerals to quantities. |
| Sorting and classification | Leaves, bottle tops, buttons, bottle covers, beads | Ask children to sort objects by colour, size, shape, texture or material. Ask why each group belongs together. | Child identifies attributes and explains grouping. |
| Patterning | Beads, coloured papers, bottle covers, pegs | Create AB, AAB or ABC patterns. Ask children to continue, copy and create their own patterns. | Child recognises repetition and predicts what comes next. |


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| Mathematics concept | Readily available materials | Teacher utilization strategy | Expected child response |
|---|---|---|---|
| Addition | Bottle tops, sticks, counters, stones | Make two groups such as 3 and 2. Bring them together and ask children to count all. | Child sees addition as joining groups. |
| Subtraction | Seeds, stones, bottle tops, cups | Start with a group. Remove some objects physically and ask children to count what remains. | Child sees subtraction as taking away. |
| Shapes | Cartons, paper plates, sticks, straws, clay | Let children form circles, squares, rectangles and triangles. Ask them to identify sides, corners and real-life examples. | Child names and describes basic shapes. |
| Measurement | Rope, sticks, hand spans, cups, containers | Compare length, height, weight and capacity using non-standard units. Ask which is longer, shorter, heavier or holds more. | Child uses comparative language and simple measuring actions. |
| Fractions | Paper plates, oranges, bread, circular cards | Divide objects into equal halves and quarters. Emphasise equal sharing before symbols. | Child understands half and quarter as equal parts. |
| Data representation | Bottle tops, picture cards, floor charts | Ask children to vote for favourite fruit or colour, then arrange counters in columns to compare results. | Child compares more, fewer and same from a simple graph. |

**Materials Work Best When Teachers Use a Clear Utilisation Model**

The second result is that teachers need a simple procedure for using materials. Materials alone do not teach. A classroom may contain many objects, but children will not necessarily learn mathematics unless the teacher guides attention, introduces vocabulary, asks questions and observes understanding. Based on the analysis, this article proposes a five-step model: select, prepare, demonstrate, manipulate and assess.

**Table 2: Five-step teacher utilization model**

| Step | Teacher action | Example |
|---|---|---|
| 1. Select the concept | Decide the exact mathematics idea to be taught. | Counting five objects, not merely chanting numbers. |
| 2. Prepare safe materials | Choose clean, large and age-appropriate objects. | Use washed bottle tops or big buttons; avoid tiny objects for toddlers. |
| 3. Demonstrate the idea | Model the action slowly while using mathematical language. | Touch each counter once while counting aloud. |
| 4. Allow child manipulation | Let children use the materials individually, in pairs or small groups. | Children make their own groups of five. |
| 5. Assess and extend | Observe, question and record evidence; increase difficulty gradually. | Ask, “How do you know these are five?” then ask for one more. |


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**Sample Classroom Activities Show How Local Materials Can Be Used**

**Activity one:** Counting with bottle tops. The teacher gives each child ten washed bottle tops. The teacher first models touching one bottle top for each number word. Children then count groups of two, three, four and five. The teacher asks: "How many do you have?" "Can you give me one more?" "Which group has more?" This activity supports one-to-one correspondence, cardinality, comparison and number language.

**Activity two:** Sorting with leaves and bottle covers. Children receive mixed leaves or bottle covers. The teacher asks them to put together objects that are the same in one way. Some children may sort by colour, others by size, and others by shape. The teacher encourages explanations: "Why did you put these together?" This develops classification, observation and mathematical communication.

**Activity three:** Patterning with beads or pegs. The teacher creates a red-blue-red-blue pattern with beads or pegs and asks children to continue. Later, children create their own patterns for classmates to copy. This helps children notice order, repetition and prediction, which are foundational to algebraic thinking (Clements & Sarama, 2020).

**Activity four:** Addition with stones. The teacher places three stones on one mat and two stones on another mat. Children count each group, bring the groups together and count all the stones. The teacher writes or shows the number sentence only after the concrete action. This helps children connect joining with addition.

**Activity five:** Measurement with ropes and sticks. Children compare the length of a table, mat or classroom line using sticks, hand spans or rope. They use words such as longer, shorter, same length and not the same. The teacher avoids standard units at first and focuses on comparison, estimation and vocabulary.

**Activity six:** Fractions with paper plates. The teacher folds a paper plate into two equal parts and explains that each part is one half. Children fold their own paper circles. Later, the teacher divides another plate into four equal parts and introduces quarters. The teacher should emphasise equal parts before using fraction symbols.

**Activity seven:** Shape construction with sticks and clay. Children use sticks as sides and small clay balls as corners to make triangles, squares and rectangles. The teacher asks: "How many sides?" "How many corners?" "Can a triangle have four sides?" This activity supports reasoning about properties rather than memorising shape names.

**Safety, Inclusion and Classroom Management Determine the Quality of Use**

The fourth result is that local materials must be safe, inclusive and well managed. Teachers should wash, dry and store materials in labelled containers. Materials for children below three years should be large enough not to be swallowed. Sharp tins, broken plastics, dirty objects, rusty metals, toxic containers and materials with strong chemical smell should not be used. Safety is part of quality teaching, not an extra responsibility. Teachers should also consider inclusion. Children with weak fine motor control may need larger objects. Children with visual difficulties may need high-contrast colours or textured materials. Children with speech delays may respond by pointing, matching or manipulating objects before verbal explanation. Inclusive material use agrees with the broader idea that early childhood programmes should support the full development of every child (Institute of Medicine & National Research Council, 2015). Classroom management is also important. Teachers should not pour too many materials at once before giving instructions. Materials should be distributed in small bowls, trays, mats or group baskets. Rules should be simple: use gently, do not throw, do not put in the mouth, return to the container, and listen when the teacher claps or sings the stop signal.

**Assessment Should Be Observation-Based and Practical**

The fifth result is that material-based mathematics makes assessment visible. Instead of asking only written questions, teachers can observe what children do with objects. A child who counts ten counters without skipping, matches a number card to a set, continues a pattern or explains why one stick is longer than another is demonstrating mathematical understanding. The checklist below can guide teachers.

**Table 3: Observation checklist for material-based mathematics assessment**

| Skill to observe | Evidence of learning | Teacher record |
|---|---|---|
| Counting | Touches one object for each number word and states total. | Achieved / emerging / needs support |
| Number recognition | Matches numeral to correct quantity. | Record numeral range. |
| Sorting | Groups objects by one attribute and explains choice. | Note attribute used. |
| Patterning | Continues or creates a repeated pattern. | Record pattern level. |
| Addition/subtraction | Joins or removes objects and counts result. | Record support needed. |
| Shapes | Names shapes and describes sides or corners. | Record shape vocabulary. |
| Measurement | Compares length, height, weight or capacity using correct language. | Record vocabulary used. |

**Discussion**

Instructional materials in early mathematics teaching should be understood as tools that support children's mathematical thinking, rather than as mere decorations or objects for entertainment. In early mathematics, children need to act on objects before they can fully understand symbols. This agrees with Piaget's view that young children learn through concrete actions and with contemporary early mathematics literature that emphasises learning trajectories from informal experience to formal representation (Clements & Sarama, 2020; Piaget, 1952). The practical guide also supports the position of the National Association for the Education of Young Children and the National Council of Teachers of Mathematics (NAEYC & NCTM, 2010) that early mathematics should be developmentally appropriate, intentional and connected to children's daily experiences. For children in Port Harcourt, local materials can make this connection visible because children already see many of the objects in homes, markets, playgrounds and school compounds. Another implication is that teacher knowledge is central. A material is not automatically instructional. The same bottle top can support meaningful mathematics or meaningless play depending on the teacher's intention. If the teacher asks children to count carefully, compare groups, explain their thinking and connect objects to symbols, the material becomes a tool for mathematical reasoning. This supports Clements and Sarama's (2017, 2020) argument that early mathematics requires intentional teaching grounded in children's developmental pathways. The discussion also highlights the need to move gradually from concrete to pictorial and symbolic representation. For example, when teaching addition, children should first join real objects, then draw the objects, then connect the action to a number sentence. This movement from concrete action to representation reflects Piaget's (1952) view that young children construct knowledge through active engagement with objects, and it is consistent with the National Research Council's (2001, 2009) emphasis on meaningful mathematical understanding.

The Port Harcourt context makes this approach particularly useful. Schools differ in resources, but most teachers can access safe local materials if they are trained to identify and organise them. A school does not need to wait for expensive imported manipulatives before teaching meaningful early mathematics. However, low-cost does not mean careless. Materials must be clean, safe, labelled, stored and linked to lesson objectives. School heads should therefore supervise both availability and actual classroom use. The role of language is also important. Materials should be accompanied by mathematical vocabulary. Teachers should use words such as count, group, compare, longer, shorter, heavier, lighter, same, different, more, fewer, before, after, first, next, between, beside, inside and outside. Children should also be encouraged to explain their thinking. Mathematical language helps children connect action with concept, and it supports cognitive and language development at the same time. Assessment through observation is more appropriate than paper tests for many early childhood mathematics skills. A child may not write numerals correctly yet but may understand quantity when manipulating objects. Teachers should therefore record what children can do with materials. This approach aligns with developmentally appropriate assessment and with the broader expectation that early childhood education should consider whole-child development rather than only written output (Institute of Medicine & National Research Council, 2015). The article contributes to practice by presenting a teacher-ready utilization model. Many articles explain that instructional materials are important, but teachers need more than

a general explanation. They need examples, steps, questions, safety rules and assessment tools. The five-step model proposed in this article can help teachers plan lessons that are purposeful, active and measurable.

**Practical Implementation Framework for Teachers**

For the article to be useful to classroom teachers, the practical guide must be translated into daily lesson routines. A teacher can begin by examining the mathematics objective in the weekly plan and then asking a simple question: "What object can help the child see, touch or act out this idea?" This question shifts the teacher's attention from decoration to learning. For example, the topic "number six" should not begin with writing 6 in a book. It can begin with six bottle tops, six fingers, six steps, six cups, six claps or six children standing in a line. The teacher should also prepare key questions before the lesson. Good questions include: "How many are here?" "How do you know?" "Can you make the same number?" "Which group has more?" "What will happen if I add one?" "What will remain if I remove two?" "Can you find another object with this shape?" These questions invite children to think and explain. They also help the teacher discover whether the child has truly understood the concept or is only repeating what others have said. A practical lesson should not use too many materials at once. For younger children, one set of materials is often enough. If the lesson is on counting, the teacher can use bottle tops only. If the lesson is on sorting, the teacher can use mixed bottle tops or leaves only. Too many colourful materials can distract children from the concept. After the concept is understood, the teacher may introduce a second material to help children transfer the idea. For example, after counting five bottle tops, children may count five stones, five spoons and five picture cards. The teacher should also move from whole-class demonstration to small-group practice. In a whole-class demonstration, children watch the teacher model the task. In small groups, children manipulate the materials themselves. The teacher then moves around the groups, listens to children's talk, asks questions and supports those who are confused. This approach is more effective than keeping all materials in the teacher's hand while children only watch. Early mathematics should be active, social and language-rich.

**Sample Teacher-Made Lesson Format**

The table below presents an actual teacher-made lesson plan showing how a common, readily available material can be used to teach an early mathematics concept. The example can be adapted for counting, sorting, addition, subtraction, shapes, measurement and patterning activities.

**Table 4: Sample teacher-made lesson plan: Sorting bottle tops by colour**

| **Subject** | **Mathematics / Early Numeracy** |
|---|---|
| **Class/Age Group** | Nursery 2 / 4-5 years |
| **Topic** | Sorting and Classification |
| **Sub-topic** | Sorting bottle tops according to colour |
| **Duration** | 30 minutes |
| **Instructional Materials** | Washed bottle tops in at least three colours, small bowls or trays, floor mats, colour cards and a labelled storage container. |
| **Previous Knowledge** | Children have seen bottle tops before and can identify common colours such as red, blue, green and yellow. |
| **Behavioural Objective** | By the end of the lesson, each child should be able to: (1) identify at least three colours of bottle tops; (2) sort mixed bottle tops into colour groups; and (3) explain the reason for the grouping using simple language such as "same colour" or "different colour". |
| **Mathematical Vocabulary** | Sort, group, same, different, colour, more, fewer, many, few. |
| **Introduction / Set Induction** | The teacher displays a bowl of mixed bottle tops and asks: "What can you see?" "Are they all the same?" "What colours can you find?" The teacher allows children to touch and name some colours. |
| **Teacher Demonstration** | The teacher places three bowls on a mat, picks one red bottle top and says, "This is red. I will put all the red bottle tops here." The teacher repeats the process with two other colours and thinks aloud while sorting. |
| **Learners' Activity** | Children work in pairs or small groups. Each group receives mixed bottle tops and sorts them into bowls or circles on the mat according to colour. The teacher moves round, observes, asks questions and gives support where necessary. |


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| **Subject** | **Mathematics / Early Numeracy** |
|---|---|
| **Guiding Questions** | "Why did you put these together?" "Which group has more?" "Which group has fewer?" "Can you find another bottle top that belongs here?" "What is different about this one?" |
| **Assessment Evidence** | The teacher observes whether each child can identify colour, place objects in the correct group, correct mistakes and explain the grouping. Records may be written as: "sorted independently," "sorted with support," or "needs more practice identifying same and different". |
| **Closure / Clean-up Routine** | Children count the groups with the teacher, return bottle tops to the labelled container, and sing a short clean-up song. The teacher summarises: "Today we sorted bottle tops by colour. Sorting means putting things that are the same together." |
| **Extension / Home Link** | Children are asked to sort safe household items at home, such as spoons by size, clothes by colour or bottle covers by colour, with adult supervision. |

This format helps the teacher move from material selection to guided child manipulation and observable assessment. The same format can be adapted for counting with stones, patterning with beads, addition with sticks, measurement with ropes, fractions with paper plates and shape construction with cartons or clay.

Home and Community Link

The use of local instructional materials should not end in the classroom. Parents can support early mathematics with household objects. Teachers can send simple home tasks such as: count five spoons at dinner, sort clothes by colour, compare two cups, identify circles and rectangles at home, arrange bottle covers in a pattern, or count steps from the door to the gate. These tasks cost nothing, yet they help parents understand that early mathematics is part of daily life. They also reduce the pressure on children to learn mathematics only through writing. In Port Harcourt, community materials such as market items, transport tickets, food containers, leaves, shells, stones and packaging cartons can be connected to classroom mathematics. This local connection makes learning culturally familiar and meaningful. It also encourages teachers to see the environment as a resource. When children recognise materials from their homes and neighbourhood, they are more likely to participate confidently and talk about their experiences.

Quality Indicators for Material-Based Mathematics Lessons

School heads and quality assurance officers can use clear indicators to judge whether instructional materials are being used well. The first indicator is relevance: the material must match the mathematics objective. The second is safety: the material must be clean, non-toxic and suitable for the children's age. The third is child participation: children should manipulate the materials, not only watch the teacher. The fourth is mathematical language: the teacher should introduce and repeat key vocabulary. The fifth is assessment: the teacher should observe and record what children can do with the materials. These indicators help prevent a common problem in early childhood classrooms: the display of materials without meaningful use. A classroom may look attractive, but if children are not counting, sorting, comparing, measuring, building, explaining and solving problems, the materials are not fulfilling their instructional purpose. Quality assurance should therefore focus on the relationship between materials, teacher action and child learning outcomes.

**Analysis**

Locally available instructional materials provide a practical basis for strengthening early mathematics instruction in Port Harcourt. The paper shows that everyday objects such as bottle tops, seeds, stones, sticks, beads, ropes, paper plates and cartons can represent important mathematical concepts when teachers select them according to specific learning objectives. This approach responds to the resource conditions described in the paper and places children's immediate environment within the mathematics learning process. The selection of a material therefore requires consideration of its mathematical purpose, safety and suitability for young children.

Concrete materials are particularly relevant to developing early mathematical understanding. Children can encounter quantity through counting objects, classification through sorting materials according to attributes, patterning through

repeated arrangements and measurement through comparison with ropes, sticks or hand spans. Addition can be represented by combining groups of objects, while subtraction can be represented through physically removing objects from a collection. Paper plates can provide a concrete representation of equal parts for early work on fractions. These activities give children opportunities to connect mathematical language and symbols with physical experiences.

The paper gives particular attention to the teacher's role in converting available materials into purposeful instructional resources. The five-step utilization model provides a practical structure for this process. Teachers first identify the mathematical concept, prepare appropriate materials, demonstrate the intended mathematical action, provide opportunities for children to manipulate the materials and assess learning through observation. This structure gives direction to classroom practice and helps teachers maintain a clear relationship between the material and the learning objective.

Teacher questioning forms an important part of this instructional process. Questions that ask children to determine quantities, compare groups, explain classifications or predict what happens after an object is added encourage children to communicate their mathematical thinking. Such interaction also gives teachers immediate information about children's understanding. A child who correctly counts a collection, identifies the quantity represented by a numeral or explains why objects belong in a particular group provides observable evidence of mathematical development. Mathematical language strengthens these learning experiences. Words such as *more*, *fewer*, *longer*, *shorter*, *same*, *different*, *before*, *after*, *inside* and *between* help children describe relationships encountered during practical activities. The teacher can introduce the vocabulary during manipulation and encourage children to use the terms when explaining their decisions. This process connects children's physical experiences with mathematical concepts and supports the communication dimension of early mathematics learning.

The paper also establishes safety, inclusion and classroom management as important conditions for effective material use. Teachers are expected to clean, dry and store materials appropriately and to select objects that correspond with children's developmental levels. Larger materials can support children with weak fine-motor control, while textured or high-contrast materials can assist children who experience visual or perceptual difficulties. Alternative responses such as pointing, matching and manipulation can provide meaningful participation for children who require additional communication support.

Observation-based assessment provides another significant element of the framework. Early mathematics learning can be demonstrated through children's actions during classroom activities. Teachers can observe one-to-one correspondence during counting, numeral-quantity matching, classification, pattern continuation, shape identification and measurement comparisons. Recording these behaviours can help teachers identify areas where children require additional practice and determine suitable extensions to existing activities. The Port Harcourt setting gives the framework additional practical relevance. Children encounter many of the proposed materials within their homes and communities, creating opportunities for mathematics learning to extend beyond classroom activities. Household objects and familiar environmental materials can be incorporated into simple home tasks involving counting, sorting, comparison, shapes and patterns. This connection can strengthen the relationship between children's everyday experiences and formal early mathematics instruction.

From a methodological standpoint, the paper presents a practice-based descriptive framework developed from literature and consideration of classroom realities. The proposed activities and utilization model therefore function as practical recommendations rather than experimentally tested evidence of learning gains. The paper provides a foundation for future empirical research examining classroom implementation, teacher competence, children's responses and changes in mathematical understanding associated with sustained use of locally available materials.

The paper presents locally available instructional materials as practical resources for making early mathematics meaningful within the Port Harcourt context. The framework gives teachers concrete guidance for selecting materials, designing activities, questioning children and observing learning. Its contribution lies in translating the broad principle of material-based instruction into classroom procedures that can operate within ordinary school and home environments.


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## Conclusion

Instructional materials are essential for early mathematics teaching because they help young children move from concrete experience to mathematical understanding. However, the value of materials lies in purposeful utilisation, not mere availability. Readily available materials such as bottle tops, seeds, stones, sticks, ropes, cups, paper plates, cartons, beads, leaves and pegs can support counting, sorting, patterning, measurement, shapes, addition, subtraction, fractions and data representation when teachers use them intentionally. The article has shown that teachers in Port Harcourt can make early mathematics more practical, affordable and meaningful by using materials from the child's environment. The teacher's role is to select the concept, prepare safe materials, demonstrate the mathematical idea, allow children to manipulate the materials and assess learning through observation. This approach makes mathematics visible, active and developmentally appropriate. The article therefore reframes instructional materials as practical tools for teacher creativity, child participation and early numeracy development. It also shows that low-cost materials can be academically valuable when guided by clear objectives, appropriate questioning and careful classroom management.

## Suggestions

1. Early childhood teachers should create mathematics material banks using safe local resources such as bottle tops, seeds, ropes, sticks, paper plates, cartons, cups and pegs.
2. Teachers should plan material use according to specific mathematics objectives instead of using materials randomly or only for decoration.
3. School heads should organize regular demonstration lessons where teachers show how local materials can be used to teach counting, sorting, measurement, shapes and simple operations.
4. Teacher education programmes should include practical workshops on designing and using low-cost mathematics materials for children aged three to six years.
5. Parents should be encouraged to support home-based mathematics activities such as counting spoons, sorting clothes, comparing cups and identifying shapes in the environment.
6. Quality assurance officers should assess not only the presence of instructional materials but also their safety, organization, relevance and actual use during teaching.
7. Teachers should use observation checklists, anecdotal notes and children's practical performance to assess early mathematics learning.
8. Schools should reduce excessive dependence on worksheets and ensure that symbolic mathematics follows concrete manipulation.
9. Local education authorities and professional associations should publish simple guides on locally available instructional materials for early mathematics teaching in Nigerian classrooms.
10. Further empirical studies should test the effectiveness of specific local materials on children's early numeracy, measurement and shape-recognition skills in Port Harcourt.

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