

Children play

Raymond I. Knight



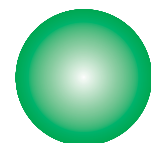
**The Foundation
for Mathematical Learning**

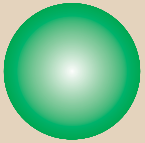
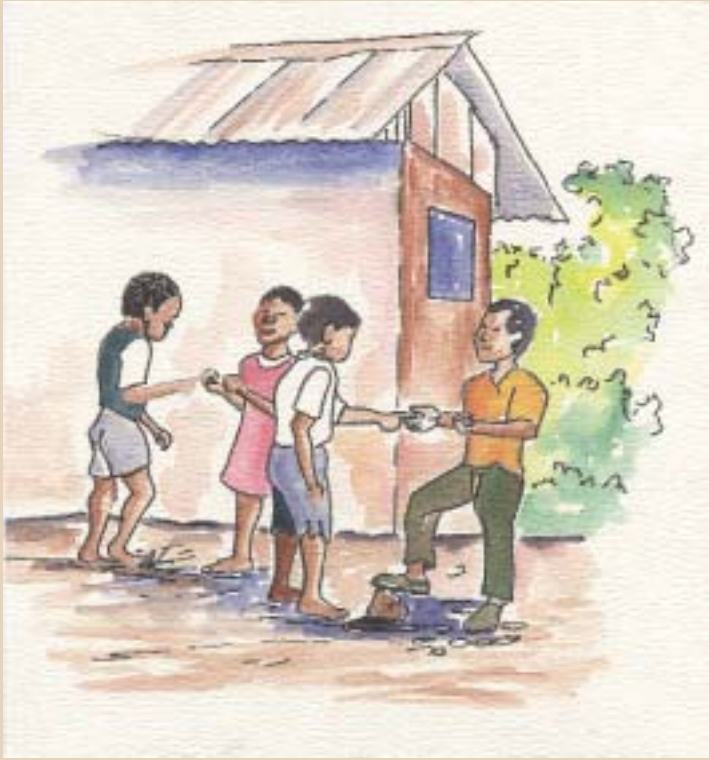
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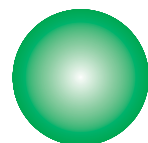
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Foreword

For decades achievement results and research have shown that children's performance in mathematics has been poor. Researchers have tried to find the answer to this phenomenon, and changes have been made to approaches in mathematics and to teacher training, yet the solution to the problem seems elusive. Some researchers have linked performance in mathematics to certain races that consistently achieve higher grades in international evaluation tests. Others have pointed out that boys tend to perform better than girls in mathematics, particularly at secondary and higher levels of education. Failure in mathematics has also been linked to children's inability to read mathematical statements.

Despite the absence of conclusive evidence on why children perform badly or well in mathematics, one thing is certain, and that is, basic numeracy must be part of cognitive competence at the primary level. Mathematics goes beyond the manipulation of figures to the overall development of the intellect. Mathematics offers an approach to analysis and problem-solving. It provides the child with a way of thinking.

A study undertaken by UNESCO showed that very poor children already acquired skills in spending money and giving correct change, before they actually enter the school system. A closer look at children showed that the games they play involve numerous mathematical concepts. The question remains: Why is it that they do not achieve proficiency in mathematics, if at an early age they have acquired some of the basic functions, and why do they not do as well as their counterparts in developed countries?

Much of the failure of the children can be attributed to the school and its processes. How does the education system determine the mathematics curriculum? What is the reference point for content and processes? How, and what, does it evaluate? What is its understanding of the development and experiences of children in third world countries? Piaget undertook studies of Swiss children, and arrived at a theory of development as it concerned certain basic functions in mathematics. But to what extent do such theories apply to children in developing countries? Very poor children are usually exposed early to "street life", and the UNESCO study showed that in fact these children acquired basic concepts in mathematics before their more privileged counterparts. Why then do they fail to do well in the school system?

A review of mathematics in third world countries points to the problems that are also evident for other subject areas. These include, inappropriate curriculum content and poor sequencing, inadequately trained and untrained teachers, badly written textbooks, insufficient textbooks and other learning materials, and little motivation for the learners. There is also a tendency to assign teachers with low mathematics levels of achievement to teach the lower primary grades.

The present study targets the games children play with a view to identifying all the mathematical concepts that they acquire from the games, and to use them as the foundation for mathematics learning in Grades 1, 2 and 3. The design proposes that the affective domain plays an important role in performance in any subject, and mathematics is no exception. The negative attitudes to mathematics that are acquired early in the children's formal education set the stage for their later performance. The early exposure to mathematics should emphasize the children's social and emotional readiness for the formal learning of mathematics. Many teachers rely indiscriminately on drills rather than on acquiring proficiency in mathematics during the primary cycle.

Mathematics is a subject that helps children to understand symbolism, develop analytic and reasoning skills, think logically, relate rules and ideas to symbolism, and

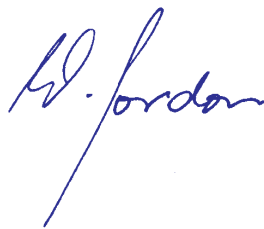
to learn its language. The importance of mathematics in the development of various essential skills demands the continuation of the search for an answer to ways of improving mathematics learning.

The study is limited to the learning experiences of grades 1 to 3 of the primary levels. At this level many children form concepts and attitudes to subjects according to their experiences. Regrettably many children start failing mathematics at this stage, and finally decide that it is too hard for them to do. This is a failing of the school system, and not of the children. It appears that education systems do not make enough effort to transform mathematical knowledge gained in play into success at school. This study is calling on education systems to recognize that mathematics learning does not begin at school, and that school should be a continuation of the children's education. The study does not go into details on how teachers may use these games. It is enough to say that the early grades should help children to develop positive attitudes to mathematics learning, as well as lay the foundations for living together.

A simple game of hop, step and jump offers various mathematical experiences. It involves addition and subtraction, shapes and design. Children in their daily lives learn quantities, "half full", handful, lapful, pocketful, they learn about money, especially the small denominations, they know long and short, and so on.

The study investigated a number of children's games and identified the mathematical concepts embedded in the games, and how children learn them. It then built learning sequences for each concept, or group of concepts, from Grades 1 to 3, using the games as the basis for teaching and learning. Ultimately, it proposes that children should not fail mathematics during the first three grades of school. This book does not claim to be exhaustive in identifying the experiences children acquire through games. It simply gives a "kick off" point for the teachers.

The study is international, although the experiences of children in Jamaica and Kenya contributed to the practical aspects.



Dr Winsome Gordon



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Learning mathematics in grades one to three

The curriculum guide for the Primary Stage of Education – Grade 3, prepared by the Core Curriculum Unit of the Ministry of Education, Jamaica, states that:

“The focus in computation of this grade is on the development of addition and subtraction skills using larger numbers, and the introduction of basic multiplication and division concepts and skills. In addition, further development of ideas of fractional numbers (equivalent fractions, simple computation) geometry, statistics, measurement and problem solving which are included, should not be neglected.”

There has been much success in the development of the basic skills mentioned above. As our students progress from grades one to three many of them appear capable of solving mathematics problems, which call for the application of basic number facts and algorithmic thinking. They, however, accurately perform basic computational operations without grasping important underlying concepts. For example, students may be able to add or subtract various measurements given in centimetres, and will also know that $100\text{ cm} = 1\text{ m}$. However, when asked to show, by drawing, approximately one centimetre, they are unable to do so. The students had not grasped the concept of a centimetre. Similarly, many major concepts in arithmetic and geometry, which are components of mathematics, have evaded our students at this level. This problem was cited by an Education officer at the Core Curriculum Unit of the Ministry of Education. He observed from visiting a number of primary schools, that many teachers appear to be fearful of teaching mathematics, and hence opted for the method of giving students an example of a problem, then having them work out a number of similar problems. This method places grave limitations on the children’s abilities, especially in a subject of this nature. It is believed that mathematics “provides opportunities for children to use their knowledge of shapes and measures, their ability to calculate and, most importantly, to think for themselves in seeing and using relationships.” (E. Newton, 1966).

In a study, *Implementing a Practical Approach to Teaching Geometry at the grade 3 level*, conducted by Valda Pryce (1994), a former student of the University of the West Indies, Mona, Pryce noted that students have limited hands-on experiences in grades one to three, resulting in poor performance in geometry in later years. This study was conducted at an urban primary school, in which students were typical of most primary schools in Jamaica. Pryce stated that the inattentive nature of students, and the often overcrowded rooms were also very good reasons to provide hands-on experiences that would “arrest the students’ attention.” She added that, in Jamaica, not much emphasis is placed on geometry, and this does contribute to the high failure rates in mathematics.

Children are, in fact, exposed to much geometry from as early as grades one to three. They encounter many different shapes in various ways in their everyday lives. It is clear, however, that in many primary classrooms, the appropriate learning experiences are not being provided to enable students to relate what they already know to the mathematics being taught. In her study, Pryce indicated that when teaching geometry to this group of grade three students, she observed that they were, “deficient in conscious perceptual discrimination, recognition and comparative skills in basic geometric ideas. Though they had experience with shapes, the visual perceptual properties evaded them.” These students could identify some shapes, but could not differentiate between them. For example, they could not tell the difference

between a square and a rectangle, or compare a small square to a large one, and see that they are the same shape. This problem is one which is prevalent at the grades one to three levels, and one which can be solved by providing the right teaching/learning experiences. The Primary Mathematics Teachers Guide (1999), produced by the Core Curriculum Unit of The Ministry of Education in Jamaica states the main geometry objective from grade one to three is as follows:

“Explore paths and/or shapes in the environment and relate basic mathematical shapes to everyday life.”

This curriculum guide emphasizes the laying of a strong foundation in grades one and two, based on the exploration of shapes and patterns found in the home and in school, and those created by the students. According to Pryce, “the child must be given the opportunity to develop his own set of concepts, given the appropriate experiences or materials to ‘do his own thing’, i.e. to use his own experience to extract the mathematics from each situation for himself or herself.”

Language and Mathematics

A large percentage of our Jamaican Primary School students use dialect when speaking. For many of them, this was their first and only language from birth. Because of this, their English language is often inadequately developed, resulting in major problems in reading, understanding, speaking or writing the English language. The Primary Mathematics Teachers’ Guide states that “Poor performance in mathematics is often much more a function of poor reading comprehension skills, than it is of poor mathematical skills. Students meet problems of comprehending mathematical statements, technical words (especially those with a different everyday meaning) and mathematical questions.”

This problem was also encountered by Pryce in her study of grade three students. She found that in administering her tests, she had to read each question to the students for them to write their solutions. They had difficulty following instructions and reading and understanding the questions on their own. This brings out the importance of using concrete visual objects, situations and experiences, to relate to mathematical language teaching at the same time. It also points to the need for the mathematics teacher to teach reading in the content area. Thus the children will learn the reading skills related to the subject, and the experience will reinforce reading taught in the language arts programme.

Meaningful Learning

Mathematics is a major part of the life of every primary school student. From the moment they wake up in the morning, get ready for school, make decisions about what to purchase for lunch, and how much they will spend, to the very games they play, e.g. ‘jacks’, picking up objects in groups of one, twos, threes, etc., they are engaged in mathematical activities. Children do not think about the mathematics involved in the daily activities they are involved in, however, these seemingly insignificant tasks provide numerous opportunities for mathematics teachers to make valuable links with the students’ prior knowledge, thereby facilitating meaningful learning.

According to Ausubel, meaningful learning is “a process through which new knowledge is absorbed by connecting it to some existing relevant aspects of the individual’s knowledge structure.” In other words, the individual must be taken from the

point of what he/she already knows in order for new ideas to take root. This is particularly important in the early primary years when much concept formation takes place. "If an attempt is made to force children to assimilate new ideas that cannot be related to knowledge, which is already in the individual's knowledge structure, the ideas can only be learned by rote", (Orton 1992). By rote learning, students do things in a mechanical way without understanding or thinking of the meaning. This is evident in much of the work done by secondary school students in Jamaica. The difficulties many have with the material taught in high school arise from underdeveloped concepts acquired at the primary level. There is, therefore, a need for education as a whole to be built on the experiences of the children.

The Primary Mathematics Teachers' Guide 1999, produced by the Ministry of Education, Jamaica, outlines two of its goals for primary mathematics as follows:

- ◆ *To enable students to develop competence, a positive attitude and confidence in dealing with day to day experiences;*
- ◆ *To enable students to develop problem-solving skills in order to deal with real life problems.*

In Jamaican society, there are many experiences in the lives of primary level children that are used as bases for good mathematics lessons. These types of lessons promote the achievement of the goals given above. Some are outlined in the table below:

Everyday experiences	Mathematical application
Getting ready for school/ trying to get to school	Time asleep/time awake/length of time to get ready/time school begins
Purchasing lunch	Spending money/giving change/addition and subtraction of whole numbers
Watching television	Time of favourite programme/ time difference
Visiting the supermarket	Solid shapes/sizes/measurements/ comparing weights, lengths/classifying
Sharing (food, etc.)	Parts of a whole/fractions
Playing on climbing frames	Plane and solid shapes/structures
Walking through the neighbourhood	Odds and evens/shapes and designs/symmetry

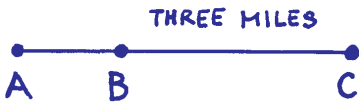
Careful planning by the teacher can enable students to discover how mathematics is a part of their lives. These ideas can be used as starting points for lessons, or as small projects which will allow students to make discoveries themselves. In these early grades, mathematics should also focus primarily on problem solving, based on daily-life experiences. Working with problems will enable them to understand effectively underlying concepts and operations or to develop mathematical reasoning.

In an attempt to dispel further any ideas students may have that mathematics is only done in mathematics classrooms, it is also important to involve issues arising from other subject areas, which will require them to follow a mathematical method to arrive at a solution to a problem. This is another way in which this subject can be made useful to them. In Jamaica students of grades one to three enjoy the benefits of an integrated curriculum which seeks to address this issue.

Determination of mathematical relevance

After a perusal of the mathematics syllabus for grades 1-3, it was clear that not only numbers relate to mathematics but also concepts such as “greater than”, “less than”, “further away from”, etc. It is also evident that in the teaching and learning process, children can learn to live together.

Findings



- ◆ In teaching the higher grades, statements such as “C is three miles further away from A than B” baffles the students, and they have no idea of how to place the three points A, B, C on a line. This shows an absence of fundamental concepts and a lack of interpretative skills.
- ◆ The ability to listen and understand (concentration), and to display keen observation techniques are frequently absent among young children. Hence the difficulty as they advance to higher mathematical levels.
- ◆ Students are too dependent on calculators for multiplication and multiples of numbers, so games that count in multiples of three or five etc., are of great importance
- ◆ The ability to concentrate, and determine whether an answer to a problem is reasonable, is lacking among most students. Perhaps certain aspects lie outside the child’s experience, which could have been obtained through related games, not necessarily number-related.

Positive attitudes and skills can be honed and practised through fun games, some of which are covered in this project.

The games that children play offer a natural model for an integrated approach to mathematics. Children are exposed to mathematical concepts as well as patterns of social behaviour that help them to cooperate and relate to each other. They learn to coordinate various parts of the body. In general they learn process skills that can be applied to many school subjects.

Since mathematics is a subject in which many children are under achievers and non- achievers, the focus of the document is on mathematical concepts learned through games. However, there will be some discussions on the social interaction of children, and the values that they could acquire while at play. Because these games are played predominantly by girls, using them as a vehicle for learning mathematics would create a gender sensitive perspective to mathematics education.

The games children play

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Jigsaw Puzzles

Play instruments	These can be bought in the market. They consist of pictures broken up into small pieces with irregular shapes.
Age group	Four years upwards
Players	Usually not more than four
Scene/Setting	Indoors
How to play	<p>While glancing at the overall picture which is on the box containing the Jigsaw, the pieces are to be fitted together to obtain the picture as seen.</p> <p>Invariably new players do not know how to start as they have no strategy.</p> <p>It is recommended that the pieces for the ends or corners are identified with a view to working inwards.</p>
Mathematical relevance	Teaches players to recognize shapes and to think logically. It helps them to recognize that the problem is more easily solved if they have a planned strategy.
Remarks	<p>Students frequently meet unfamiliar problems, and are unable to develop a strategy for their solution.</p> <p>Jigsaw puzzles develop techniques for a strategic approach to problem solving.</p>
Social behaviour	<p>Learning to work together to achieve a common goal.</p> <p>Children are able to make their own Jigsaw puzzle to encourage creativity and design techniques.</p>



Tic Tac Toe or Ikiato

Play instruments	A sheet of paper with a rectangular figure (as illustrated). Three stones and three bottle stoppers or six bottle stoppers (each player uses three – one turns them up, the other down).
Age group	Four years upwards
Players	Two
Scene/Setting	Indoors or outdoors
How to play	Children draw a four-sided figure (a rectangular figure). It is then divided into four equal parts with lines that cross at the centre, then divided further by two lines that cross at the centre and end in the corners. The final figure has nine points. Each player places his/her stones or bottle stopper alternately on vacant points on the figure in an effort to get them in a straight line, or to prevent the opponent from so doing. The child who first gets his stoppers or stones in a straight line wins.

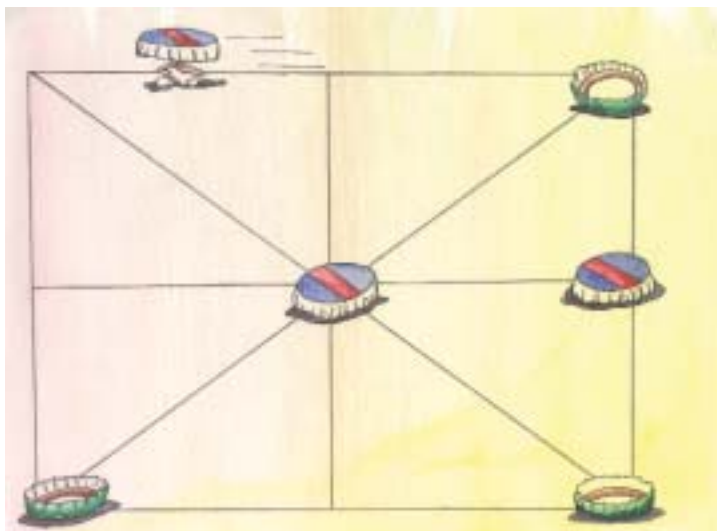
Note: Stoppers/stones may be moved around the board, on the straight line adjoining, to a vacant position. No jumping over opponent's stoppers/stones is allowed.

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Mathematical relevance Appreciation of straight lines, centre of a line, a point through which several lines pass, and develops a strategic approach to problem solving.

Teaches drawing and counting skills. Teaches shapes – rectangle, triangle. Depending on the age group the children can design the playing board using their mathematical set. Young children can colour the shapes that they find. In later years, the implications of the diagram for mathematics learning.

Social behaviour Setting one's goals and overcoming challenges to achieve them.



1, 2, 3 Auntie Lulu

Play instruments	Skipping rope
Age group	Six to nine years. Usually girls
Players	Three at a time
Scene/Setting	Outdoors
How to play	<p>Two children turn the rope while one child skips/jumps over the rope.</p> <p>Those turning the rope will say '1, 2, 3 Auntie Lulu.' On the count of '3' the child who has skipped 3 times must stoop, while those turning, swing the rope above her head saying 'Auntie Lulu', before resuming to count '4, 5, 6' to which the child has to skip 3 times again. If she does not keep the rhythm by jumping back into the rope, immediately after 'Auntie Lulu' is said or if she is touched by the rope, she is 'out': If the child skipping keeps the rhythm, she remains in the game.</p> <p>Note: The counting continues '4, 5, 6 Auntie Lulu,' '7, 8, 9 Auntie Lulu', at which point, counting continues '10 Auntie Lulu,' '11 Auntie Lulu,' '12 Auntie Lulu,' '13 Auntie Lulu', speeding up the game.</p> <p>Then the children start the count again and the child skipping remains until she is 'out'.</p>
Mathematical relevance	Counting and concentration, develops coordination.
Social behaviour	Cooperation, anticipation and trust.



Cinderella

Play instruments	Skipping rope
Age group	Seven years and upwards
Players	Three girls at a time
Scene/Setting	Outdoors
How to play	<p>Two children turn the rope, while one child skips.</p> <p>Those turning the rope will be saying 'Cinderella, Cinderella dressed in her kanga went down town to meet her Mama. How many kisses did she get? 1, 2, 3, 4, 5, etc.'</p> <p>The counting and skipping continue until the rope touches the foot of the skipper and the rhythm is lost. Then another 'Cinderella' starts skipping.</p>
Mathematical relevance	Counting and concentration
Social behaviour	Teamwork



Sindalia Kumaganda

(I did not eat beans)

Play instruments	Skipping rope
Age group	Three to six years
Players	Three or more
Scene/Setting	Outdoors
How to play	Children form groups of three or more. Two children stand at points that fit the length of the rope. The third child goes to the centre. The two start turning the rope in a circular manner as the child in the centre skips. She does so while singing and counting. If they count up to 10, she wins the game; but if she fails to skip or steps on the rope, she loses. The game is played in turns.

The Song:

I didn't eat the beans (x 2)

I am skipping once (x 2)

I didn't eat the beans

*I am skipping the second time oti**

I didn't eat the beans

Mother you have cheated on me

**oti. An exclamation to liven the song*

Mathematical relevance Counting; rhythm

Social behaviour "Rhythms" in daily life have the advantage of security, keeping one on the right track. However taken too far, a "rhythm" could mould the child to function only in set situations, and not to be ready to deal with the "out of rhythm" situations.





1, 2, 3, 4

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Play instruments

Children themselves

Age group

Six to nine years

Players

Fairly large group of children

Scene/Setting

Outdoor

How to play

Some children kneel in a circle. Another set choose a partner from those kneeling and stand behind them. There should be one odd person standing.

The group starts singing 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 right up to 20. Then 1 and 20, 2 and 20, 3 and 4 and 5 and 6 and 20, 27, 28, 29, 30. Then 1 and 30, 2 and 30, etc. The count goes on until they reach 100.

While the singing is proceeding the odd child walks or skips around the group, and eventually stands behind one of those who is standing. That person whom he stands behind now has to move and skip around, and stand behind someone else who is required to move, etc. This changing of partners goes on until the singing reaches 100, and the person who does not have a partner when the singing stops will start the new game. For the new game, those kneeling will switch places with those standing.

Note: During the singing, pace the counting, and speed up to near 100 to add excitement to the game, (as the children will be jostling not to be the odd one out when the singing stops)!

Mathematical relevance

Counting, concentration, rhythm

Social behaviour

Encourages happy interaction, taking chances and accepting outcomes.

1, 2, 3, Red Light

Play instruments	Children themselves
Age group	Four years upwards
Players	Three upwards
Scene/Setting	Outdoors
How to play	<p>Children line up some distance from one child whose back is to them.</p> <p>That child keeps saying "1,2,3, red light" at which point he/she turns around. The children in the line up move towards him/her to see who can get there first, with a view to replacing him/her. Each time he/she turns around and sees anyone moving or unstable, that child has to return to the start line.</p> <p>The first child to reach him/her, replaces him/her.</p>
Mathematical relevance	Following instructions and developing the art of listening
Social behaviour	<p>Peer leadership and learning to follow.</p> <p>Children learn to respect the authority of the leader. When there is disagreement the decision is taken on the basis of the group. The children take turns at being leaders and followers.</p>



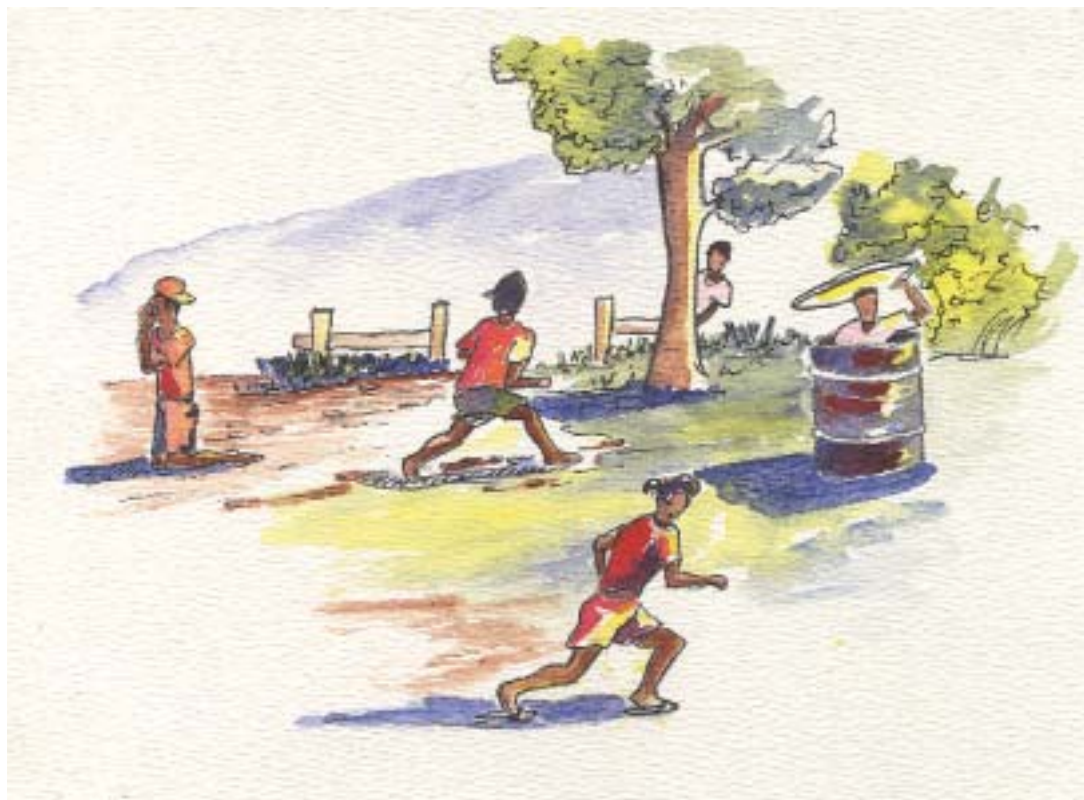
Dandy Shandy or Kwivalula (Aiming and Dodging)

Play instruments	Ball (usually tennis ball size)
Age group	Four to six
Players	Three or more children
Scene/Setting	Outdoors
How to play	Two children stand facing each other about thirty feet or ten metres or more apart. Another child stands between them, and is the object to be hit with the ball as it is thrown. If the child in the centres dodges the ball by either going to the left or right, crouching or moving up and down, he or she usually shouts "sight" as an indication of having better eyesight than the thrower.
Mathematical relevance	Teaches keen observation.
Social behaviour	Children learn to estimate challenges and to make an effort to overcome them.



Hide and Seek

Play instruments	Children themselves
Age group	Four years upwards
Players	Unlimited
Scene/Setting	Indoors or outdoors
How to play	<p>One child is required to count to either 50 or 100 while the others go and hide. At the end of the count, the child who was counting, goes to find one of the hidden children.</p> <p>The child found first now has to do the counting while the others hide.</p> <p>Note that the counting can be done from 1 to 50, increasing by one each time as is normal, or count in multiples of 2 i.e. 2, 4, 6... 50.</p> <p>Other multiples of counting using 3s up to 5s may be used as agreed at the beginning of the game.</p>
Mathematical relevance	Develops counting and knowledge of multiples of chosen numbers.
Social behaviour	Anticipation, creative thinking, getting clues from the environment, and using these to help locate the object.



Hop Scotch

Play instruments

Two to three children, uniquely identifiable game pieces, e.g. small stones

Age group

Eight to nine years

Players

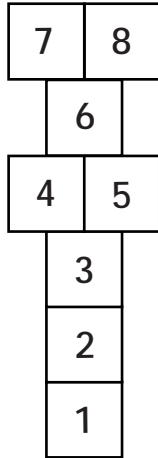
Usually not more than four

Scene/Setting

Outdoors

How to play

Each child has a different piece.



Draw up eight boxes, singles and doubles (see diagram).

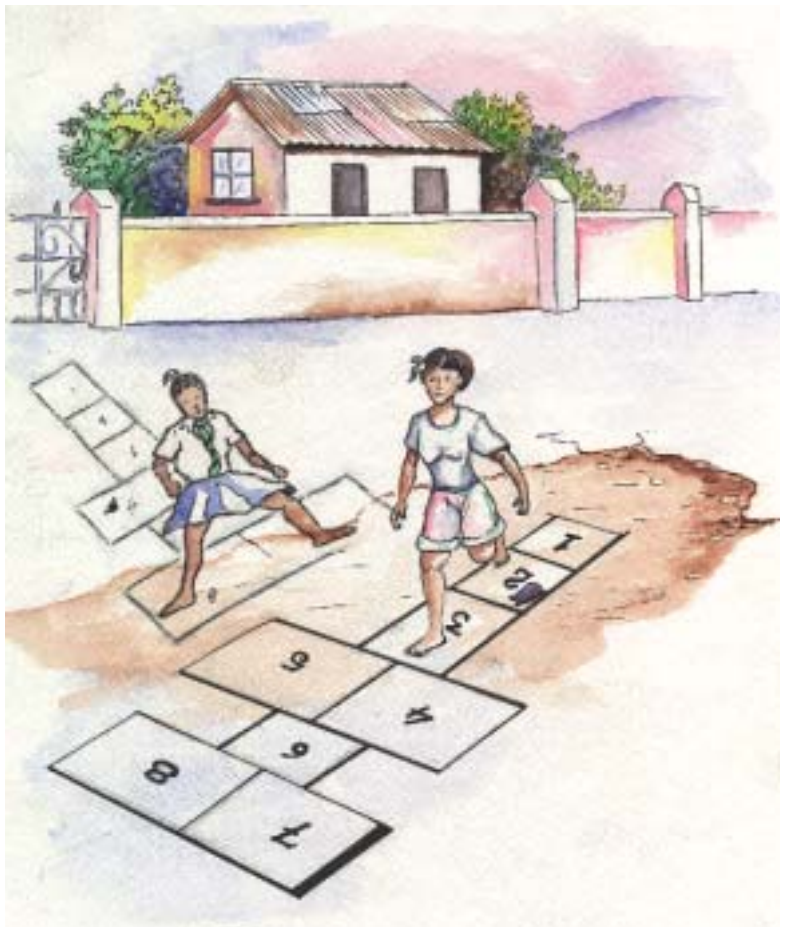
The first child puts his piece in the first box.

Then he/she jumps in box 2 to 8, turns around and jumps back the way he/she came, picking up the piece on his/her return.

Then he/she throws the piece in the second box and repeats the process.

The idea is to jump in each box without touching the lines, or losing balance. The process is continued until your piece has been put in all eight boxes.

Single boxes are jumped with one leg, while double boxes are jumped with both legs



If you touch the line at any time, your piece is left in the box, the next person plays until he/she touches, then you start where you left off. The first person to finish all eight boxes is the winner.

Mathematical relevance Counting, geometrical construction – rectangles.

Social behaviour Develops concentration, endurance, and physical balance by learning how to distribute body weight.

Shiswecheli (Similar to HOP SCOTCH)

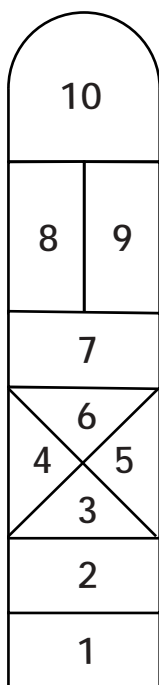
Play instruments A piece of broken pottery, a ten-cent coin or a shapely stone. A pattern drawn on the ground (see illustration).

Age group Five to six years and above

Players One to four children, mainly girls

Scene/Setting Outdoors

How to play The first child/player throws a piece of pottery, or ten cent coin or stone, into the first segment of the pattern. She jumps on one leg over this compartment into the second compartment as she plays. She then jumps into all the other compartments until the last one. At the 4th and 5th compartments, she stands astride with one foot in the 4th compartment and the other in the 5th. The same is repeated at compartments 8 and 9 before she proceeds.



At compartment 10, she turns back the same way she came until she reaches the compartment before the piece of pottery, she bends, picks it up, and jumps over this compartment to the outside with the piece. She then throws the piece into the second compartment, and continues the game, jumping over the compartment with the piece to the last compartment, and turns back the same way she came, to the outside. This is repeated with the piece being thrown into each successive compartment until the last one has been covered.

At this juncture she steps into compartment 10, with both feet still facing the front, and throws the piece over her head without looking back. If the piece falls well into one of the compartments, it becomes her territory. If at one point the child aims at a compartment and misses, she loses, and another child takes over the game.

Mathematical relevance Counting and develops the ability to follow instructions. Recognizing and drawing shapes

Social behaviour Ownership, endurance

Kikumbusho (Similar to Hop Scotch)

Play instruments	Kijonjo – a piece of broken pot (Ikijonjo)
Age group	Four to six years
Players	One to four children
Scene/Setting	Outdoors
How to play	<p>Children draw a rectangular – like shape (like in Shisweheli) on the ground, and divide it into ten parts. When this is done, the children take the Ikijonjo and divide it into further parts.</p> <p>One child starts playing while the rest watch. The player tosses the Kijonjo into the nearest square and starts hopping into the squares, while taking care to hop over the square that has the Kijonjo. If the player hops into, or accidentally steps into the square that has the Ikijonjo, she/he loses the game. The next child starts playing. When the Kijonjo has been thrown into all squares, children who are successful stand at the far end of the drawn figure, and throw the Kijonjo into the designated areas of squares, while facing in the opposite direction. The child who is able to throw the Kijonjo into the correct place wins that square and it becomes his/her 'House'. The rest of the children should take care not to step in that square as their turn to play comes. If a child fails to hop over, he loses the game and falls out.</p>
Mathematical relevance	Counting and concentration.
Social behaviour	Ownership, endurance.

King Lion (Shihulukhu)

Omwami Italanyi

Play instruments	The children themselves
Age group	Three upwards
Players	More than four children
Scene/Setting	Outdoors
How to play	<p>One child assumes the position of a lion (Italanyi). He moves/goes ahead of the children as the others question him.</p> <p>Rest (of the children): King Lion, what time is it? Lion: Seven o'clock. Others: King Lion, what time is it? Lion: It is noon. Others: King Lion, what time is it? Lion: It is the hour to feed on (eat) sheep, (here the children run away as the lion chases after them).</p>
Mathematical relevance	Counting
Social behaviour	<p>Develops listening skills. Learns to run away from danger.</p> <p>Note: Teacher can adopt this game to teach the time.</p>



Mother May I?

Play instruments	Children themselves
Age group	Four upwards. Usually girls
Players	Three years upwards
Scene/Setting	Indoors or outdoors
How to play	Choose a leader.

Children stand in a circle on a horizontal line facing the leader. The leader says "Sandy take two giant steps" Sandy must ask "Mother may I?" Then the leader will reply "Yes, you may" before Sandy can carry out the instruction. If Sandy does not ask the question "Mother may I?" nor await the response "Yes, you may", then she is out of the game. Of course, Sandy will also be out of the game if she does not carry out the instruction correctly. The leader continues calling on the children to perform fun activities until all are out. They can then start over again.

Mathematical relevance Develops memory, concentration, initiative, counting and the ability to follow instructions precisely.

Social behaviour Politeness, respect, listening and acting according to instructions.



Musical Chairs

Play instruments	Even number of chairs, odd number of children, music
Age group	Six to nine
Players	Usually more than seven children
Scene/Setting	Indoors or outdoors
How to play	<p>Line up chairs, one child should be without a chair. Children stand behind the chairs.</p> <p>Start the music and children move around the chairs. Stop the music, and any one not sitting on a chair is out. Remove a chair each time, and continue the process until one chair and two children are left.</p> <p>The child sitting when the music stops is the winner.</p>
Mathematical relevance	Concept of arithmetic progression and subtraction.
Social behaviour	Develops attentiveness and coordination. Learns to set parameters for decision making. (The chairs and the music determine which child stays in the game.)



One Love/Units

Play instruments	Children themselves
Age group	Six to nine years
Players	Five or more children
Scene/Setting	Outdoors or indoors
How to play	Choose a leader. Children stand in a circle. The leader says 'one love' or 'unit one', and each child stands on his own. The leader says 'three love' or 'unit three', and children rush to hug in clusters of three. The extra person in a cluster is 'out'. The leader continues to call random units until they have had enough of the game.
Mathematical relevance	Ability to count quickly, appreciation of batches/sets
Social behaviour	Children learn the concepts of inclusion and exclusion. Lots of hugging fosters emotional support and development.

Note: No clusters with the leader.



Simon Says

Play instruments	Children themselves
Players	Four years upwards
Scene/Setting	Three upwards
How to play	Indoors or outdoors

Children are numbered off and stand around a leader (Simon). Simon chooses a number at random and issues instructions. For example, "Number 7 stand on one leg" number 7 has to ask "Simon, may I?" and get a response "Yes" before doing so. If the above procedure is not followed precisely then that person is 'out'.

The last person remaining, wins the game.

Suggestions: Simon can say "Take three large steps", "Hop four steps", "Kneel on one knee", etc.

Mathematical relevance	Developing the art of following instructions and procedures.
Social behaviour	Listening and responding.



Tsibea Ne Kigumba

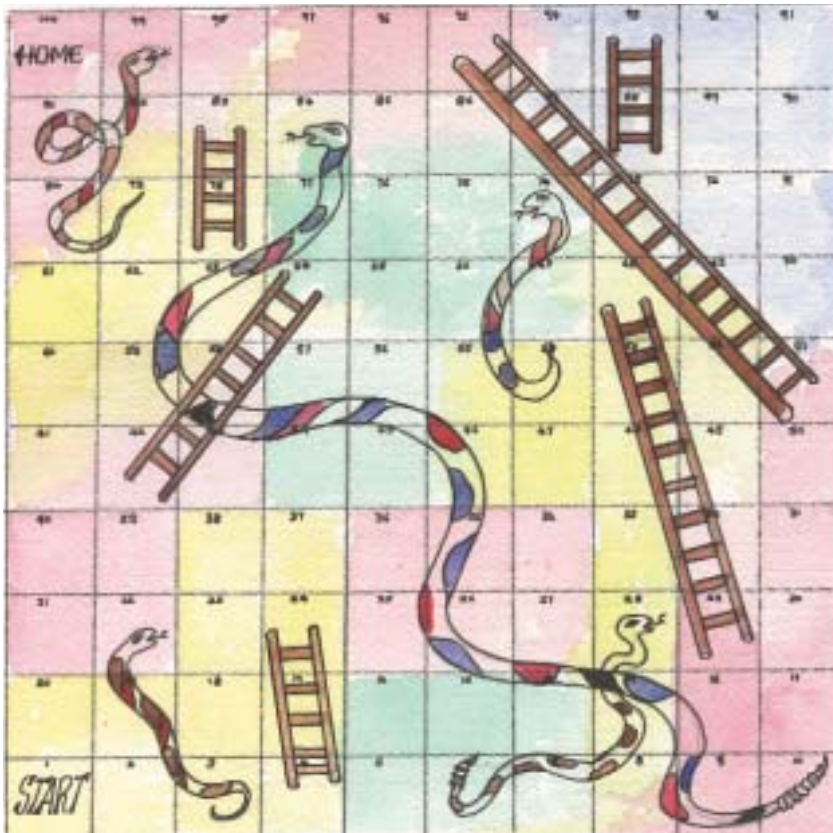
(A dog and a bone)

Play instruments	Stones, sticks and a piece of cloth.
Age group	Four to six years
Players	Usually eight children or more
Scene/Setting	Outdoors
How to play	<p>Children stand in pairs facing each other and form two lines. The pairs are given numbers. An object is placed in the middle of the two lines.</p> <p>The leader calls out the numbers of two children, and the child, one from each team who has that number is required to run very fast, and the first to reach it will pick up the object and return to the group.</p> <p>The child who picks up the object earns a point for his group.</p>
Mathematical relevance	Counting
Social behaviour	Listening, responding, problem solving.



Snakes and Ladders

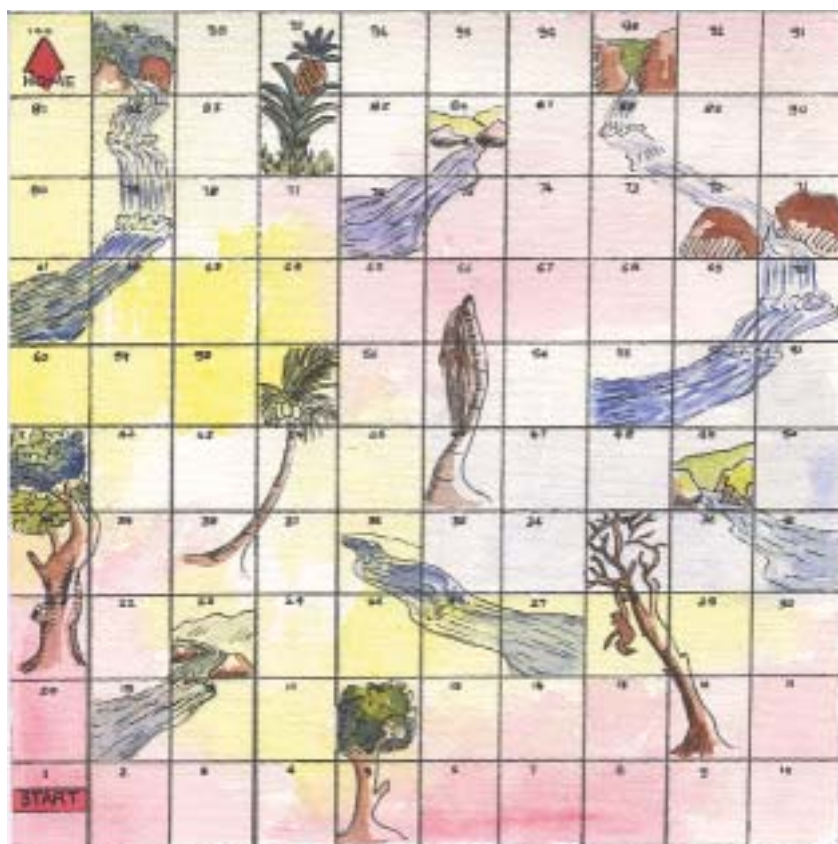
Play instruments	A snakes and ladders board, which can be bought. A die (dice) for throwing or strips of paper numbered 1 to 6. These strips of paper are concealed before drawing. Uniquely identifiable pawns (pieces) for each player
Age group	Six years upwards
Players	Two to four
Scene/Setting	Usually indoors
How to play	The die is thrown by each player, (or each player selects a strip of paper), and the player with the highest number plays first. Each player moves his pawn in accordance with the number thrown. If the number ends at the foot of a ladder, the player moves to the top of the ladder; if the number ends at the mouth of the snake, then the player goes down to the end of its tail. The first person to reach the end of the board, which is at the top right hand corner, wins. <i>Note:</i> The board game Ludo, has the same relevance.
Mathematical relevance	Counting, following instructions precisely
Social behaviour	Learning to play together. Understanding opportunities and the need to pursue one's goal although there might be setbacks.



Trees and Rivers

Play instruments	A board can be drawn (see diagram). A die (dice) for throwing, or strips of paper numbered 1 to 6. These strips of paper are concealed before drawing. A uniquely identifiable pawn for each player.
Age group	Six years upwards
Players	Two to four
Scene/Setting	Usually indoors
How to play	The die is thrown by each player, or each player selects a strip of paper, and the player with the highest number plays first. Each player moves his pawn in accordance with the number thrown. If the number ends at the foot of a tree, the player moves to the top of the tree; if the number ends at the top of the river, then the player goes down to the end of the river (river mouth). The first person to reach the end of the board, which is at the top right hand corner, wins. The pineapple offers a bonus point of 10. It is not a tree.
Mathematical relevance	Counting and following instructions precisely. The concept of the river – it flows downwards.
Social behaviour	Teaches cooperation, honesty in counting. (Same as for Snakes and Ladders).

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Bingo

Play instruments	Bingo boards, chips or tokens, a bag carrying the bingo pieces
Age group	Six years upwards
Players	More than three
Scene/Setting	Indoors or outdoors
How to play	<p>Choose a leader.</p> <p>Children are given boards which have random numbers printed under the letters Bingo (see diagram).</p> <p>They are also given more, or an equal number of chips, to numbers on the board.</p> <p>The leader shakes the bag and takes out a bingo piece whatever number comes up, e.g. B4, I40, etc. The idea is for participants to match numbers called, straight across diagonally, full house, with those on their boards.</p> <p>The first person to get the required formation calls: 'Bingo' and wins.</p>
Mathematical relevance	<p>Develops ability to identify numbers and follow instructions carefully.</p> <p>All the children in a class can be involved. Concept of direction of line – diagonal, horizontal, vertical. Concept of shapes, e.g. square, oblong, triangle.</p>
Social behaviour	Listening, responding, sharing in one's happiness.



Chavahtsa Nenda Chavalitsa

(Edible or non-edible)

Play instruments	Children themselves
Age group	Three to six years
Players	More than three
Scene/Setting	Usually outdoors
How to play	Children hold hands in a circle. Once the circle is complete, they let go their hands and choose a captain. The captain names the animals eaten by people locally. Children will be required to jump. The leader/captain may mention non-edible animals. If a child jumps at such a mention, he/she is removed from the circle.
Mathematical relevance	Concentration and develops listening skills.
Social behaviour	Selection and acceptance of leaders. (Cultural attitudes towards certain animals.)



Find the Ball

Play instruments	Small ball or some other object
Age group	Six to nine years
Players	Five or more children
Scene/Setting	Usually outdoors
How to play	Children stand in a circle and each child has a number. One child goes away while the children position the ball in someone's hand. (Children pretend that their hands represent a newspaper). They start to chant "find the ball in the Gleaner" (name of local newspaper), while the ball is passing behind from hand to hand.

The odd child comes back into the circle asking 'Who has the ball?', and begins to guess randomly 'no 5, or 4,' etc.

Note: At each incorrect guess, the chant is done. The child has three chances to find the ball. If not, someone else takes over. If found, the child who had the ball, goes in the ring, and the game starts over again.

- Mathematical relevance** Concentration and alertness
- Social behaviour** Teamwork, loyalty



Fizz Buzz

- Play instruments** Children themselves
- Age group** Six years and upwards
- Players** Unlimited
- Scene/Setting** Indoors or outdoors
- How to play** Children are placed in sequence, either in a line or in rows, indicating clearly that movement is from left to right. The first child will say "1", the next "2" and so on. Let us say that from the outset we agree to play with multiples of 3.
When the third child is reached he or she says "Fizz" instead of saying "3". The next child says "4" and

the counting continues till either the next multiple of 3 or a number containing the digit 3 is reached, then that child says "Buzz".

In this case at 6 the child says "Buzz", at 9 says "Fizz" at 12 says "Buzz" and at 13 says "Fizz" until a previously agreed number like 21 is reached, at which point the child says "Fizz Buzz".

The child who breaks the rhythm of the count, or says the wrong thing e.g. "Fizz" instead of "Buzz", or a number instead of Fizz or Buzz, or does not say "Fizz Buzz" at the agreed number 21 is out.

Counting may go to 100, or you may choose to start over again as soon as the agreed number is reached.

Mathematical relevance Counting, concentration, following instructions precisely. Ability to recognize multiples of numbers chosen at the outset, and the digit when it appears in the sequence of counting.

This game can be played with the whole class.

Social behaviour Communication, confidence building.



Jacks

Play instruments	Small ball, six or ten 'jacks'
Age group	Six to nine years
Players	Two to four, particularly girls
Scene/Setting	Players are seated in a circle indoors or outdoors
How to play	<p>At the outset the number of games being played is decided. The first player holds the jacks in his or her palm, and throws them up in the air, with the objective of catching all six or ten on the back of the hand (back-anie). This process of catching all six or ten in a back-anie constitutes one game.</p> <p>The number of jacks which fall off have to be taken up one at a time, until all six or ten are in hand. This is done by throwing up the ball, picking up the jack, then catching the ball after the first bounce.</p> <p>Then the jacks are thrown/spread out cautiously, and it is time to take them up in twos (without touching adjoining jacks and catching the ball as before, after the first bounce). This process continues until 3s 4s etc., right to 6 or 10 are taken up. This constitutes another way of completing a game.</p> <p>Remember, if you touch any that are not being taken up, or the ball runs away, then you defer to your partner who goes through the same process.</p> <p>The first person to reach the number of games agreed is the winner.</p>
Mathematical relevance	<p>Develops ability to count, concentrate and recognize batches/sets</p> <p>Remarks: Develops eye and hand coordination.</p>
Social behaviour	In case of discrepancy arrive at a common agreement with the other partner(s).



Tsikoora (Tossing and catching stones)

Play instruments	Five small, light stones
Age group	Five years and above
Players	Two to four children, particularly girls
Scene/Setting	Either indoor or outdoors.
How to play	Children sit in a small circle. One of the children starts the game by placing five small stones on the ground. She picks one of the stones, tosses it into the air. Before it comes down she skilfully picks one of the remaining four stones, and then gets hold of the one in the air into the same palm. She puts one of the two stones aside, and again tosses the remaining one into the air, picks one stone from the ground and catches the one in the air. She repeats the processes, picking the stones up one by one until they are over. She gathers them and repeats the game by throwing one stone in the air, and picking them up, two by two, then three by three, until she picks up all four at once. Finally, she will put all the five stones in her palm, and toss them into the air, but not too high, and attempts to catch them using the outer part of the palm. Whatever number she manages to get hold of adds up to her points.
Mathematical relevance	Counting, following instructions, ability to remember.
Social behaviour	In case of discrepancy, arrive at common agreement (same as for Jacks).



Ship Sail

Play instruments

Age group

Players

Scene/Setting

How to play

Roasted corn grains or peanuts, or any other edible grains that can be hand held.

Four years upwards

Two at a time

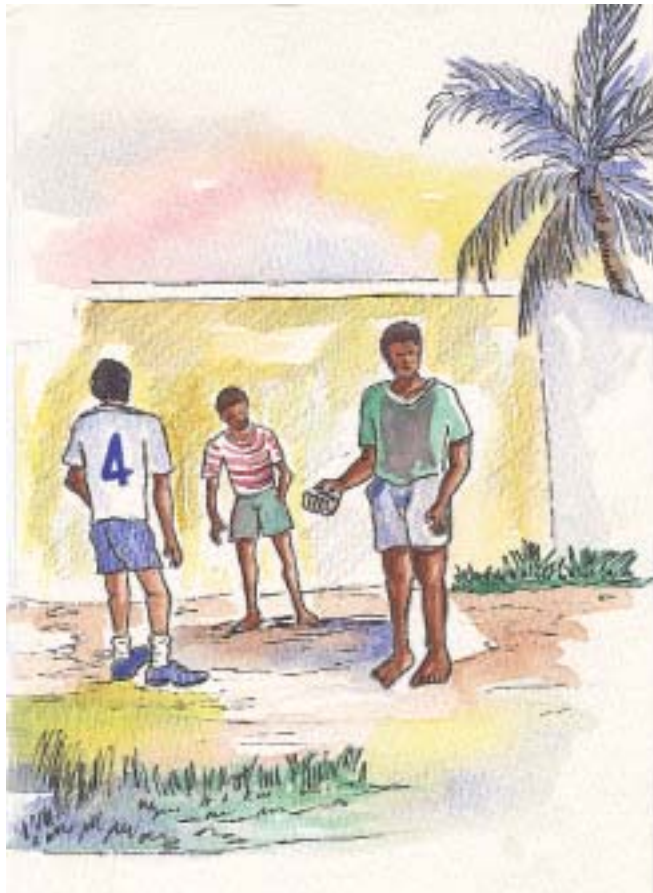
Indoors or outdoors

A child places a number of grains in his or her hand, and says: "Ship sail, sail fast, how many men on board?" The other child might ask for a glimpse of what is held in the hand. A glimpse is usually left to the discretion of the child holding the grains (often if many grains are held a glimpse is given, if not no glimpse). After the child has guessed, the grains are then counted. If guessed correctly, he or she gets the grains. If not, he or she has to pay the other the number of grains guessed.

Mathematical relevance Observation, estimating and counting.

Social behaviour

Children learn to win and lose in a non-threatening environment. They are able to try many times over and to accept the consequences of losing. They also learn to meet their obligations.



Stagger Lee



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Play instruments

Children themselves

Age group

Six years upwards

Players

Any number greater than three

Scene/Setting

Outdoors

How to play

A leader (Stagger Lee) is chosen and the rest of the children numbered off. Hence if five children remain, they are numbered from 1 to 5.

Stagger Lee: (Starts the rhythm by clapping his/her hands, then thighs, back to a hand clap which the other children pick up and keep going together.)
Zim Zim Zee, I'm Stagger Lee, who stole the cookie from the cookie jar? Number 1 stole the cookie from the cookie jar.

Number 1: Who me?

Stagger Lee: Yes, you.

Number 1: Couldn't be.

Stagger Lee: Then who is it?

Number 1: Number 3 stole the cookie from the cookie jar.

Number 3: Who me?

Number 1: Yes, you.

Number 3: Couldn't be.

Number 1: Then who is it?

Number 3: (Continues the dialogue by choosing any number at random, or even Stagger Lee.)

Any child who loses the rhythm by not picking up his or her cue when his or her number is called, or changes the procedure as outlined above, is out.

This continues until one child remains, who is the winner.

Note: In the above example, Stagger Lee chose 1 and number 1 chose 3 – any number could have been chosen by these players at random.

- Mathematical relevance** Develops listening, concentration and recognition of numbers.
- Social behaviour** Working within constraints and rules. Also develops rhythm.

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Card game

Play instruments	Playing cards
Age group	Six years upwards
Players	Two to ten
Scene/Setting	Mainly indoors
How to play	Each player is dealt two cards (two to ten players), and they evaluate their hand by each card counting the number on it. The Jack, Queen and King value 10 respectively, and the ace may value either 10 or 1 as the player chooses.

The aim of the game is to count 21 or the nearest number below 21.

Over 21 loses to all numbers below 21.

With the above criteria starting from the player to the left of the dealer, each player can ask for either none or more cards one at a time, until he or she chooses to stop in the attempt to get close to, or exactly 21 points.

When each player has taken his/her requirement from the dealer, all hands are turned over and assessed. If more than one player has 21 then the one who achieves it with most cards wins. If no player obtains 21, the one closest to 21 from below wins (e.g. 22 is closer to 21 than 18, but 18 wins as it is a number from lower).

Mathematical relevance	Counting, assessing comparative values, and developing strategies.
Social behaviour	Cooperation, making wise choices.





Donkey Card game

Play instruments

Playing cards

Age group

Six years upwards

Players

Two to six players

Scene/Setting

Mainly indoors

How to play

Each player is dealt six cards.

The player on the left of the dealer plays first, by playing a card in a suit (spades, hearts, diamonds and clubs are suits), which he/she hopes no one else can beat by playing a higher number card in that suit (ace being the highest). Each player must play a card in the suit played. If he does not have a card in the suit played, he should go to the pack and pick up the cards until he finds one in the suit. The highest card of the suit wins the round, and entitles the owner of that card to play next, using the same criteria as before.

The player who empties his hand first is the winner, and the game may continue to determine who comes last. Usually, the person who comes last becomes the dealer for the next game.

Mathematical relevance

Recognition of numbers, appreciation of the concepts higher and lower, and appreciation of suits/sets.

Social behaviour

Learning to live together – accepting “winning” and “losing” as a part of life. This behaviour applies to all the games, but is more acute in the card game where the players are usually fewer, and winning is more dependent on the skill of the individual players.

Go Fishing

Card game

Play instruments

Playing cards

Age group

Six years upwards

Players

Two to six

Scene/Setting

Mainly indoors

How to play

Each person is dealt six cards.

The remaining cards are placed in the centre of the playing area.

The person to the dealer's left plays first, by asking the other players for a card number to match an existing one in his/her hand. The first person to say they have that card, hands it over to the person who asks. If no one has that card, then the person asking is told to go fishing, which entails picking up a card from the pack in the centre. At that stage, if that card matches any number card in the hand, the player can put both cards down on the table facing upwards.

The next player on the left has an opportunity to ask for a number and the game continues, until the first person gets rid of all the cards out of his hand. That person is the winner, and the game ends.

Note: At the beginning if matches appear among the six cards dealt in one hand, they are immediately placed upwards on the table. Also, all three of the same number can be played at the same time.

Mathematical relevance

Number recognition and familiarity and appreciation of sets of equal numbers.

Social behaviour

Honesty, trust.



Matching Card

Play instruments

Cards are made from four colours of cartridge paper (e.g. green, blue, yellow, red); 4 zeros in green, 4 ones in green, to 4 nines in green; 4 zeros in blue, 4 ones in blue, to 4 nines in blue. This is done for all four colours (see diagram).

Age group

Six to eight years

Players

Two to four

Scene/Setting

Indoors

How to play

Deal seven cards to each player, and put the rest in the centre. The dealer plays first by turning up a card in the centre, and then either places a card with the same number or colour from his/her hand on it.

The next player on the left matches the top card on the board, either by the same number or the same colour. If the player has neither the same number nor the same colour card, other cards are picked from the pack at the centre until a match is found, which he/she plays.

The matching process continues until the player who finishes first, wins, and the game goes on until the last place is determined.

Note: In the case of matching numbers if the player has more than one of that number in his/her hand, all can be played in the same play with the colour of the player's choice exposed at the top. For example if there is a red four on the board, and the person to play has two fours, – a green and a yellow – they can both be played at once, and he can choose whether the green or yellow four is placed on top.

Mathematical relevance

Develops quick number recognition techniques for developing strategies.

Social behaviour

Develops quick colour recognition and logical reasoning.



Remembrance

Card game

Play instruments	Playing cards (these can be made by the teachers)
Age group	Six years upwards
Players	Two to six
Scene/Setting	Mainly indoors
How to play	The deck of cards is dealt placing the cards in rows face down on the table. The player on the left of the dealer, has a chance to turn over two cards (in the positions they occupy). If the cards match in numbers, then the player retains the match, and is allowed to play again. If they do not match, the player returns them to the position they previously occupied, and the next player plays.

The deck of cards is dealt placing the cards in rows face down on the table. The player on the left of the dealer, has a chance to turn over two cards (in the positions they occupy). If the cards match in numbers, then the player retains the match, and is allowed to play again. If they do not match, the player returns them to the position they previously occupied, and the next player plays.

Each player should make a mental note of the cards replaced, in order to assist them in selecting matches for themselves.

The player with the most matches when all the cards are removed from the table, wins the game.

Mathematical relevance Number recognition, appreciation of equal sets, and concentration, memory stimulation.

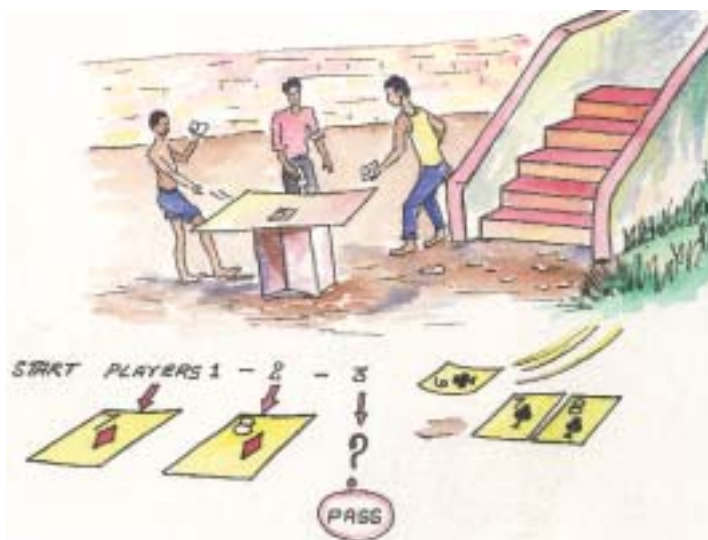
Social behaviour Develops memory.



Sevens

Card game

Play instruments	Playing cards
Age group	Six years upwards
Players	Three or four
Scene/Setting	Mainly indoors
How to play	<p>The pack is dealt out (three or four players – if three players, take out one of the aces so that the cards can be evenly divided). The game starts with the 7 of diamonds, and the next player on the left can either play the 8 of diamonds, the 6 of diamonds or another the 7, which is placed beside the 7 of diamonds. If he/she has none of these then he passes. The next player on the left, can play either one above, or one below the card exposed making sure it is in the same suit, or another 7. Cards above the 7 of diamonds, will be 8, 9, 10, Jack, Queen and King of diamonds; and those below will be 6, 5, 4, 3, 2 and the ace of diamonds.</p> <p>The same hierarchy or numbering above/below the 7 of clubs, the 7 of hearts, and the 7 of spades obtains. The player who finishes his/her hand first, wins, and the game continues in order to determine who comes last.</p> <p>Note: A hand with few extremities* is a good hand. Therefore one tends to hold a 7 for which there are no extremities for as long as possible, in order to purge cards to enable you to get rid of your extremities.</p> <p><i>*Extremities are Jack, Queen, King, Ace.</i></p>
Mathematical relevance	Teaches ascending and descending order and suits/sets
Social behaviour	Planning strategies to meet the challenge



Strip me

Card game

Play instruments	Playing cards
Age group	Six upwards
Players	Two to four
Scene/Setting	Mainly indoors
How to play	The deck is dealt evenly between two players.

All cards inclusive of 10 and below are considered "bush", and are worth nothing. Players play alternately, with the non-dealer playing first. If a player produces either jack, queen, king or ace, the other player is required to pay in accordance with the following rules.

Ace demands a payment of 4 cards (bush);

King demands a payment of 3 cards(bush);

Queen demands a payment of 2 cards(bush);

Jack demands a payment of 1 card (bush).

If in the midst of payment of any of the above the player produces either an ace, king queen or jack, then payment stops, and the other player must now pay in accordance with the card played.

The player who obtains all the cards, or strips the other player of all cards, wins.

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Mathematical relevance Teaches comparative values

Social behaviour Teaches obligation and cooperation

