



# EDUCATIONAL TOY FOR KIDS

Design research project

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**Design brief:**

To design an educational toy for kids.

**Introduction:**

In a certain phase of early age development, children are most often inseparable from other toys. However the basic function of toys should be to simply create fun time playing, toys manufacturers should provide educational-oriented toys so that you can help children to find out and develop fundamental abilities including cognitive thinking, physical skills, problem-solving, numbers, language, colors, and much more. Since toddlers or preschoolers are becoming more informed about digital-based games, educational toys manufacturers have to overcome difficult challenges on the market.

The research project was undertaken as a part of the subject Design research. The research process was divided into two parts: Primary and secondary. The first phase of research started with secondary research and was followed by primary research.

**What are educational toys?****[1]**

Educational toys (sometimes called "instructive toys") are objects of play, generally designed for children, which are expected to stimulate learning. They are often intended to meet an educational purpose such as helping a child develop a particular skill or teaching a child about a particular subject. They often simplify, miniaturize, or model activities and objects used by adults. An educational toy is expected to educate. It is expected to instruct, promote intellectuality, emotional or physical development. An educational toy should teach a child about a particular subject or help a child develop a particular skill. With respect to the age group, they can be classified into Baby (0-1 year), Toddlers (1-3 years), preschool (3-5 years) and school (5-12 years).

**• Toys for babies:**

Babies are eager to learn about the world around them, and they have much to learn. Every new shape, color, texture, taste and sound is a learning experience for them. Giving your baby toys that are safe and stimulating will help him discover his senses. Rattles and toys that make music are favorites of infants. Toys with contrasting colors are fascinating to babies and stimulate their developing vision. As they grow, infants can use toys to explore object permanence and cause and effect relationships. They also need objects such as blocks to help them build motor skills and hand-eye coordination.

**• Toys for Toddlers :**

Toddlers can play with a wider variety of toys than they did when they were smaller. They might still enjoy some of the toys they played with as babies, and that's fine. The same blocks they played with a year or two ago can provide them with new and different educational opportunities as their knowledge expands. But they also need toys that are designed with kids their age in mind. Shape sorters are great for toddlers. They teach them how to match similar items and provide parents the opportunity to teach them the names of the shapes. Lego blocks provide an opportunity to learn more about colors and symmetry while they develop their motor skills.

**• Toys for Preschool and School-Aged Children:**

When children reach preschool age, it's time to start learning about letters, numbers and language skills. Giving them the opportunity to have fun while practicing the things they are learning in school will increase their retention of those things. And when child finds an educational toy she really likes, she will be more likely to play with it, reinforcing the things she has learned. Children can learn a lot from playing. When you give your child educational toys and play with them with her, it gives her a chance to bond with you, learn, and have fun at the same time. And making education enjoyable will help your child retain the things she learns and develop a positive attitude toward learning.

## Child Psychology

[11][12]

Child psychology, a key part of developmental psychology. Also called **child development**, the study of the psychological processes of children and, specifically, how these processes differ from those of adults, how they develop from birth to the end of adolescence, and how and why they differ from one child to the next.

## Areas of Child Psychology

[12][13]

### Child development

The study of child development is often divided into four broad areas: physical, cognitive, speech and language, and social and emotional.

1. **Physical development:** Generally occurs in a relatively stable, predictable sequence, refers to physical body changes and includes the acquisition of certain skills, such as gross-motor and fine-motor coordination.

**Fine motor skills:** Use of small muscles (eg. Fingers, toes)

**Gross motor skills:** Use of large muscles (eg. Arms, legs)

2. **Cognitive or intellectual development:** It refers to the processes children use to gain knowledge and includes language, thought, reasoning, and imagination

3. **Speech and Language:** It is the ability to understand and use language for communication.

4. Because social and emotional development are so interrelated, these two areas are often grouped together. Learning to relate to others is part of a child's social development, while emotional development involves feelings and the expression of feelings. Trust, fear, confidence, pride, friendship, and humor are all part of one's social-emotional development.

- **Emotional development:** Involves learning what feelings and emotions are, understanding how and why they happen, recognizing one's own feelings and those of others, and developing effective ways of managing them. This complex process begins in infancy and continues into adulthood. The first emotions that can be recognized in babies include joy, anger, sadness and fear. Later, as children begin to develop a sense of self, more complex emotions like shyness, surprise, elation, embarrassment, shame, guilt, pride and empathy emerge.

- **Social development:** It involves acquiring the values, knowledge and skills that enable children to relate to others effectively and to contribute in positive ways to family, school and the community.

### Developmental milestones

[10]

Developmental milestones are an important way to measure a child's progress in several important developmental areas. Essentially, they act as checkpoints in a child's development to determine what the average child is able to do at a particular age. Knowing the milestones for different ages helps the psychologist understand normal child development and also aids in identifying potential problems with delayed development.

1. **Physical milestones:** They pertain to the development of both the gross and fine motor skills.

(Refer Appendix-2)

2. **Cognitive or mental milestones:** They refer to the child's developmental aptitude for thinking, learning, and solving problems. (Refer Appendix-1)

3. **Social and emotional milestones:** Pertain to the child's ability to express emotion and respond to social interaction (Refer Appendix-3)

4. **Communication and language milestones:** They involve the child's developing verbal and non-verbal communication skills. (Refer Appendix-4)

**Exploration strategies:**

[9]

- Mouthing
- Mouthing and looking
- Rotating and transferring hand-to-hand
- Insertion (Body into object and object into body)
- Banging, throwing and dropping
- Combining objects
- Matching objects
- Using objects appropriately
- Representational play
- Imaginative play
- Testing the limits

**Toys by age and development**

[3]

Children’s developmental levels influence what they need and how they like to play. The reciprocal is also true; play can influence a child’s development. Children’s play can contribute to their sense of identity and social expectations. Children become bored or frustrated when they play with toys that do not offer the appropriate type or level of stimulation. For these reasons, toys are designed towards the child’s level of development.

Toys must:

- Allow for manipulation, exploration, and practice
- Encourage children to pretend
- Support solitary play as well as play with others
- Provide opportunities for expressing ideas, feelings, and relationships
- Help children develop their own sense of meaning or understanding

**First 3 months:**

- Up to their third month, babies lack the skill to engage in active play. Rather, they explore with their eyes and ears. A new born visual focus is best at a close range between 20.3 and 30.4cm from their face. They prefer bright colors such as red, blue, and green and like high contrasts such as black and white patterns. They prefer faces and basic shapes like circles, squares, and triangles.

**3 to 6 months:**

- Children between 3 and 6 months of age can reach, grasp, pull and shake. These infants continue to put objects into their mouths. They can sit without support, roll over, and visually track objects. They enjoy social interactions, distinguish among familiar people and show preferences among people. Basic language starts with cooing, gurgling and laughter.
- Goals include touching, holding, batting, turning, shaking, kicking, mouthing and tasting

<ul style="list-style-type: none"> <li>• Easy to grasp</li> <li>• Self-activated</li> <li>• Safe for mouthing</li> <li>• Visually and auditory stimulating</li> </ul>	<ul style="list-style-type: none"> <li>• Rattles, or teething rings with thin handles to fit their gr</li> <li>• Suction cup rattles</li> <li>• Ankle rattles</li> <li>• Bright, shiny, colorful objects, stuffed toys, large balls</li> <li>• Measuring spoons</li> <li>• Rolling large balls with internal chimes</li> <li>• Crib and floor gyms</li> <li>• Activity quilts</li> <li>• Soft and squeaky toys.</li> </ul>
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### 6 to 12 months:

- Between 6 and 12 months, children become much more mobile. Many children move from creeping, crawling, pulling up to stand and cruising to independent walking. Fine motor skills improve and many children develop a pincer grip by the end of their first year. In addition to mouthing, children bang, rotate, insert, drop and throw objects, and transfer objects between hands.
- By 11 months, infants can remember people, objects, games, and actions with toys. They show persistence and interest in novelty. Socially, children from 6 to 12 months old like a familiar person nearby. They watch, imitate, and recognize their effects on others. They enjoy social games such as peek-a-boo. They babble, imitate sounds, and may even have a few words in their vocabulary.
- Goals include action and manipulation

<ul style="list-style-type: none"><li>• Visually complex patterns and bright primary colors</li><li>• Physical action</li><li>• Self-effect</li></ul>	<ul style="list-style-type: none"><li>• Wind-up toys</li><li>• Stacking toys</li><li>• Blocks and boxes</li><li>• Activity boards</li><li>• Bath toys</li></ul>
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### 24 to 36 months:

- 2 year olds are refining their large and small muscle skills. They want to jump from heights, hang from their arms, run, tumble, and play rough-house. They push, pull and steer well. Their fine motor skills enable them to enjoy manipulating small objects and drawing.
- 2 year olds understand counting and numbers. They are interested in pattern, sequence, order and size, as well as textures, shapes and colors.
- 2 year olds have a large vocabulary. Nursery rhymes and finger games are fun and challenge their little fingers. They recognize characters on television. They desire independence and feel strongly about their accomplishments and failures, yet they also need quiet time.
- Goals include practicing for skill refinement

<ul style="list-style-type: none"><li>• Gross, fine, and perpetual motor</li><li>• Balance</li><li>• Imitation play: realistic representations</li></ul>	<ul style="list-style-type: none"><li>• Playground equipment</li><li>• Wagons, scooters, tricycles</li><li>• Dough, finger paints, water colors</li><li>• Simple shape sorters</li><li>• Large connecting blocks</li><li>• Large plastic bats and balls</li><li>• Wading pool and water toys</li><li>• Toy kitchens, lawn movers, tools, grocery cart, phone</li><li>• Dolls that can be fed, bathed, and changed</li><li>• Stuffed animals</li><li>• Simple story books and 3-5 piece puzzles</li><li>• Play sets of people, cars and animals</li></ul>
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### 3 to 5 years:

- Preschool children run, jump, and balance with assurance. They like to take risks and test their physical strength and skills. Fine motor control improves, enabling them to cut with scissors, grip pencils, manipulate computer mouse's, and string beads. Creating is important as they paint, draw and build. They draw representational pictures and want to know how things work.

- Dramatic play peaks; they love to use costumes and props to create fantasy scenes. Gender differences appear in both their play and their assumption of various roles. By 5, play has become cooperative and practical. They may not be ready for competitive play, but preschoolers enjoy playing games of chance with others.
- Goals include improving skills, encouraging imagination

<ul style="list-style-type: none"> <li>• Creativity and dramatic play</li> <li>• Toys for fantasy or representational play</li> <li>• Realistic detail and working parts</li> <li>• Gross, fine and perpetual motor and balance skills</li> <li>• Games of chance not strategy</li> </ul>	<ul style="list-style-type: none"> <li>• Dress up clothing and costumes</li> <li>• Life size play houses and forts</li> <li>• Toy cash registers, money, food, cars, tool, carriages, dolls, etc</li> <li>• Push, pull and riding toys</li> <li>• More complex shape sorters</li> <li>• Pegs, peg boards and hammers</li> <li>• Crayons, paper, blunt tipped scissors</li> <li>• Connecting blocks or logs</li> <li>• Toy musical instruments</li> </ul>
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### 6 to 8 year olds:

- They engage in a variety of physical activities. They may grip their pencil tightly and close to the tip, but with too much too light a pressure. However, by their 8<sup>th</sup> year they are less tense when holding pencils, utensils or tools. Communication skills now go beyond listening and talking. Children between 6 and 8 can read, spell and print. They are interested in games and sports, because they now understand rules and strategies, and they can read directions. Magic tricks fascinate them because they border between fantasy and reality. They still enjoy dramatic play, but prefer it planned and organized rather than creating situations and fantasies as they go along. They have an acute sense of mastery. They want to do well, and they enjoy seeing their creations. By 8, children find performing for an audience more fulfilling, such as during sports or recitals. They sustain their interests enough to begin hobbies or collection.
- Team sports interest them, because they are learning to interact, trust and discover that group effort can achieve more than singular efforts. Most develop a best friend and their special friends and cliques satisfy the new felt need to belong. They play cooperatively with others and enjoy group activities. They expect their peers to play fair and live up to particular standards. Their play is generally with same sex peers.
- Goals include final product, results and goals

<ul style="list-style-type: none"> <li>• Realistic detail and working parts</li> <li>• Gross, fine and perpetual motor and balance skills</li> <li>• Creativity and construction</li> <li>• Promotion of friendships or social interactions</li> <li>• Games of chance, but also strategy</li> </ul>	<ul style="list-style-type: none"> <li>• Sports equipment</li> <li>• Button, sticker, and jewelry making kit</li> <li>• Building systems</li> <li>• Sports teams</li> <li>• Magic kits</li> <li>• Video and computer games</li> </ul>
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### 9 to 12 year olds:

- They are interested in strength, skills and teams. Their physical abilities are honed, although they may still be somewhat awkward due to acceleration and asymmetries of anatomical growth. Depending on the child, they may be active or passive, depending on both their experiences and availability of activities. They can think critically, evaluate ideas and people, and form their own opinions. However, acceptance of their peers is critical to most pre-teens and teens and they often bend their own opinions to those of the group around them. Social groups become more structured. Boys tend to be more involved with peer group activities while girls tend to have more intimate and individual relationships.

- Goals include complexity, final product, results, goals and social interaction.

<ul style="list-style-type: none"> <li>• Sports and recreation</li> <li>• Creativity and construction</li> <li>• Thinking, problem solving, and strategy</li> <li>• Social interactions</li> <li>• Collectables</li> <li>• Electronic devices</li> </ul>	<ul style="list-style-type: none"> <li>• Sports equipment</li> <li>• Kits: models, jewelry</li> <li>• Games of strategy</li> <li>• Team sports</li> <li>• Cards, stamps, toys, dolls</li> <li>• Digital games</li> </ul>
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### Toy vs Game:

S.No.	Toy	Game
1	An object for a child to play with, typically a model or miniature replica of something	A form of play or sport, especially a competitive one played according to rules and decided by skill, strength, or luck
2	A toy is an object	A game is a certain form of activity that people can play with.

### What is play?

[2][6]

Play is essential to early learning and an important mediator in physical, social, cognitive, and language development of young children. Quality play is important because:

- It promotes close relationships
- Promotes language
- Promotes creativity
- Promotes physical development
- Promotes thinking skills
- Promotes social skills
- Children gain knowledge
- They gain understanding of size, shape and texture

A play must fulfil the following:

[2]

- Must be pleasurable: Children should enjoy the activity
- Intrinsically motivated: They engage in play simply for satisfaction the behavior itself brings. It has no extrinsically motivated function/goal.
- Should be process oriented: Means are more important than the end
- Freely chosen: Should be spontaneous and voluntary
- Actively engaged: Players should be physically/ mentally involved in the activity
- Non-literal: Involves make-believe.

Play can be classified into the following and develops with respect to age of the child:[7]

- **Unoccupied play:**  
In the early months of infancy, from birth to about three months, your child is busy in unoccupied play. Children seem to be making random movements with no clear purpose, but this is the initial form of playing.
- **Solitary play:**  
From three to 18 months, babies will spend much of their time playing on their own. During solitary play, children are very busy with play and they may not seem to notice other children sitting or playing nearby. They are exploring their world by watching, grabbing and rattling objects. Solitary play begins in infancy and is common in toddlers. This is because of toddlers'



limited social, cognitive, and physical skills. However, it is important for all age groups to have some time to play by themselves.

- **Onlooker play:**

Onlooker play happens most often during the toddler years. This is where the child watches other children play. Children are learning how to relate to others and learning language. Although children may ask questions of other children, there is no effort to join the play. This type of play usually starts during toddler years but can take place at any age.

- **Parallel play:**

From the age of 18 months to two years, children begin to play alongside other children without any interaction. This is called parallel play. It also helps children gain the understanding of the idea of property right such as “mine.” They begin to show their need of being with other children their own age. Parallel play is usually found with toddlers, although it happens in any age group.

- **Associative play**

When your children are around three to four years of age, they become more interested in other children than the toys. This play is sometimes referred to as “loosely organized play.” Associative play helps preschooler learn the do's and don'ts of getting along with others. Associative play teaches the art of sharing, encourages language development, problem-solving skills and cooperation. In associative play, groups of children have similar goals. They do not set rules, although they all want to be playing with the same types of toys and may even trade toys. There is no formal organization.

- **Social play:**

Children around the age of three are beginning to socialize with other children. By interacting with other children in play settings, your child learns social rules such as give and take and cooperation. Children are able to share toys and ideas. They are beginning to learn to use moral reasoning to develop a sense of values. To be prepared to function in the adult world, children need to experience a variety of social situations.

- **Motor/physical play:**

When children run, jump, and play games they engage in physical play. Physical play offers a chance for children to exercise and develop muscle strength. Physically playing with your child teaches social skills while enjoying good exercise. Children will learn to take turns and accept winning or losing.

- **Constructive play:**

In this type of play, children create things. Constructive play starts in infancy and becomes more complex as your child grows. This type of play starts with baby putting things in his/her mouth to see how they feel and taste. As a toddler, children begin building with blocks, playing in sand, and drawing. Constructive play allows children to explore objects and discover patterns to find what works and what does not work. Children gain pride when accomplishing a task during constructive play. Children who gain confidence manipulating objects become good at creating ideas and working with numbers and concepts.

- **Expressive play:**

Some types of play help children learn to express feelings. Materials may include paints, crayons, colored pencils and markers for drawing pictures or writing. It can also include such items as clay, water, and sponges to experience different textures.

- **Fantasy play:**

Children learn to try new roles and situations, experiment with languages and emotions with fantasy play. Children learn to think and create beyond their world. Children stretch their imaginations and use new words and numbers to express concepts, dreams and history.

- **Cooperative play:**

Cooperative play begins in the late preschool period. The play is organized by group goals. When children move from a self-centered world to an understanding of the importance of social contracts and rules, they begin to play games with rules. Games with rules teach children the concept that life has rules that everyone must follow.

### What is play value?

[7]

It is a term used to describe the overall enjoyment of a child with a certain toy. It consists of complex of factors such as complexity and challenges, appropriateness for the context, correspondence to the characters of the child.

It is what motivates a child to start playing, to continue and elaborate the play activity, what makes them feel satisfied when they stop and what makes them return to the activity.

Toys have enhanced play value when they fulfill the following given criteria's:

- Can be used in many ways.
- Allow children to be in charge of the play.
- Appeal to children at more than one age or level of development.
- Can be used with other toys for new and more complex play.
- Will stand the test of time & continue to be part of play as children develop new interests & skills.
- Promote respectful, non-stereotyped, non-violent interactions among children.
- Help children develop skills important for further learning and a sense of mastery.
- Can be used by children to play alone as well as with others.
- Can be enjoyed by both girls and boys.
- Allows children to use their imaginations
- Engage their senses

### Characteristics of toys:

[3]

S.No.	Characteristics	Definition
1	Size of Parts & Shape of Parts	The dimensions of a toy or parts of toys. The size and shape of a toy is related to the age of children for which the toy is appropriate. Undeveloped fine-motor skills, such as those of younger children, encourage larger, rounded toys and parts, while more advanced skills and the desire for challenge in older children encourages smaller and more complicated toys and parts.
2	Number of Parts	The quantity of elements included within the toy as a whole. Differences in children's ages and developmental levels affect their reception of and interaction with toys that have single or multiple parts.
3	Interlocking/Loose Parts	Whether a toy includes more than one piece, and how those pieces interact. This characteristic largely pertains to construction toys, such as blocks and model kits, which include more than one piece that may (interlocking) or may not (loose parts) be connected. Toys with loose versus interlocking parts have different levels of appeal among children of various ages, motor skills, and cognitive abilities.
4	Materials	The substances from which the toy or parts of the toy are constructed (e.g., wood, plastic, vinyl, and foam). This also describes suitable characteristics of these materials since some materials (e.g., metal) are more appropriate for older children than for younger children.
5	Motor Skills Required	The specific levels of fine- and gross-motor skills that are typically required for a child to successfully interact with a toy. Fine-motor skills pertain to the ability to

		control the hands and fingers, including hand/eye coordination. Gross-motor skills apply to the large muscle coordination necessary for using a toy. The amount of fine- and gross-motor skill required by a toy can play a large role in determining the appropriate age range for a toy.
6	Color/Contrast	The colours or contrasts used in the toy. The purpose of toy color is predominantly for appeal and marketing. While some research studies indicate that infants prefer reds to blues and patterns to solids, no literature suggested that such preferences are Developmentally based among toddlers, pre-schoolers, or children in the late early childhood years. Culture and gender issues play a large role in colour appeal.
7	Cause & Effect	The attributes of toys that respond in some way to children's actions, either through lights, sounds, movement, or change in property. The cause and effect can range from very simple to highly complex and is directly related to the level of cognitive or motor skills required from a child.
8	Sensory Elements	Those characteristics of toys that appeal to any of the five senses. These elements were considered on the basis of lights, sounds, texture, smell, and taste. Stimulation of the five senses provides different responses from children at different ages.
9	Level of Realism/Detail	The visual design of toys and their intended use. Level of realism is described in two ways: cartoonish versus real appearance and child versus adult qualities. Cartoonish/Real details pertain to the visual presentation of a toy. Level of maturity, cognitive ability, and motor skills are considered for the child/adult determination.
10	Licensing	Toys with ties to outside influences—primarily media—contain a licensing characteristic. Television shows, movies, books, and sports figures are the main sources of licensed toys. Licensed character images try to connect the emotional feelings associated with the media to the toy product. The appeal of the licensed product varies depending on the age of the child and the child's exposure to the media associated with the product.
11	Classic	Toys that maintain appeal with consumers over generations. Purchasing decisions made by adults are affected by the classic status of particular toys.
12	Robotic/Smart	Features Toys powered by remote controls (attached or not) or computer chips. Robotic/smart toys have the ability to respond in an interactive fashion with the user. Appropriateness is evaluated in terms of ease of use, remote response, and the level of cognitive sophistication required to use the toy as intended
13	Educational	Toys designed and marketed specifically for academic gains. The appropriateness of these toys depends on the level of cognitive ability necessary to engage in an intended educational way, and the type of material, size, and number of parts

#### **User research:**

User research was done through both online and offline platforms. Survey was conducted by random sampling at Play schools in Dehradun, India. Questionnaires were prepared, surveys and interviews were conducted separately for Teachers and Parents.

#### **Stake holders:**

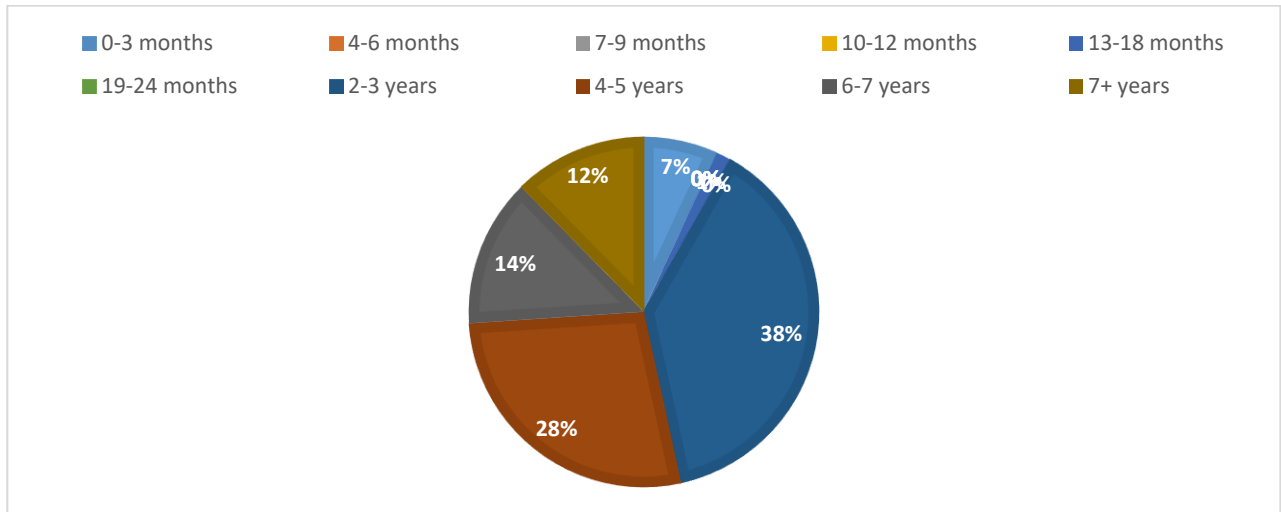
Stakeholders are people who are directly or indirectly associated with the product. The possible stake holders of Educational toys were found out to be:

- Children
- Parents
- Manufacturer
- Play school teachers

### Data analysis:

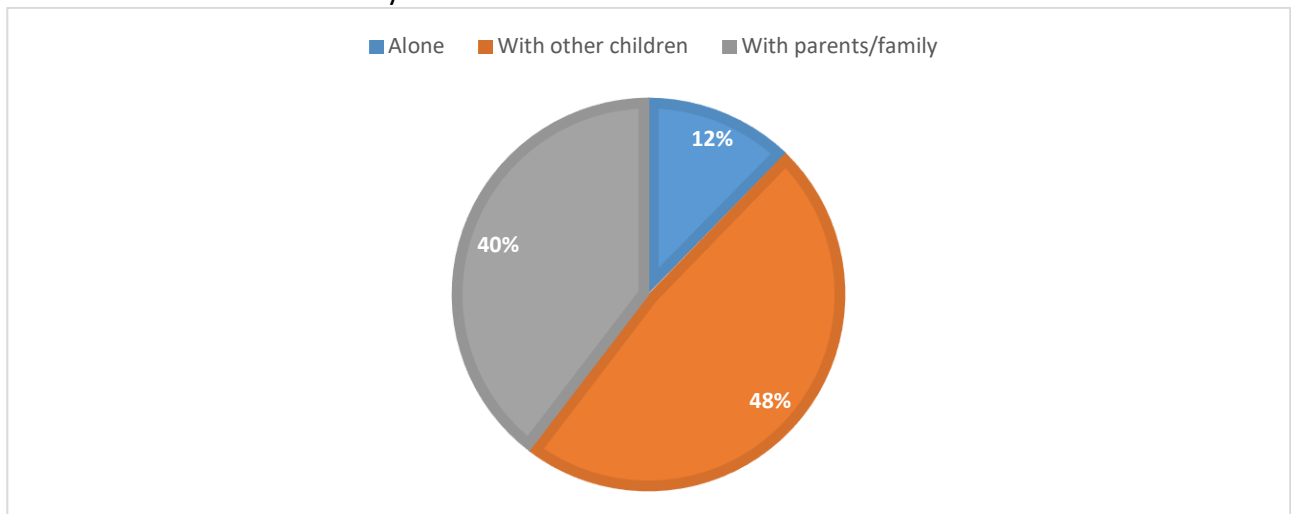
#### Age group of children studied:

- Majority of children were found to be toddlers (2-3 years) and pre-school kids (4-5 years) with 60% boys and 40% girls.



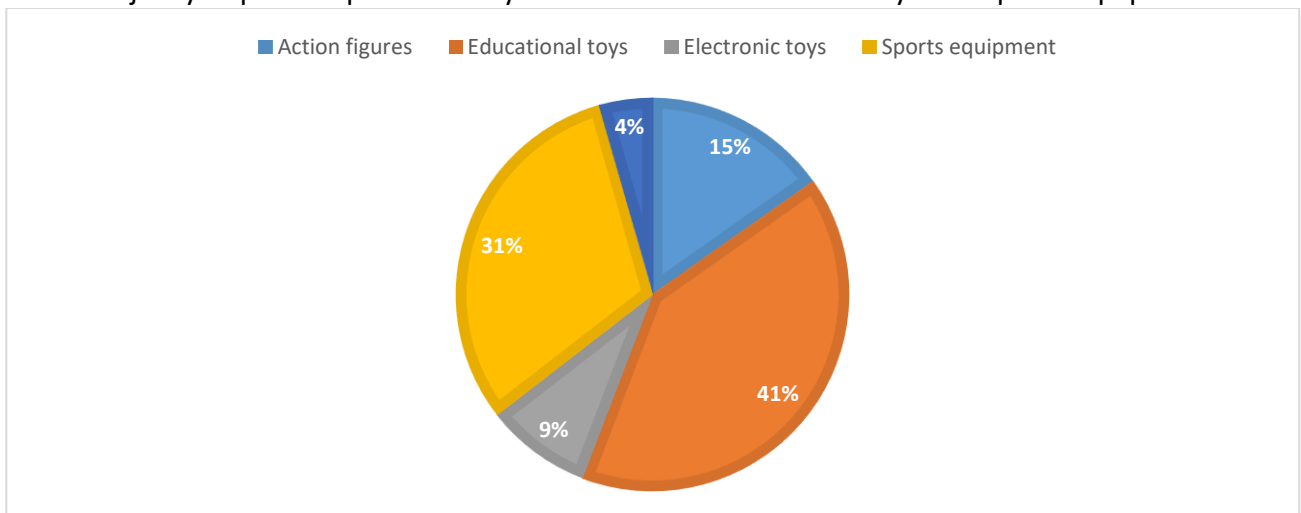
#### How does your child prefer to play?

- It was observed that majority of children enjoy company and prefer to play with other children and their family.



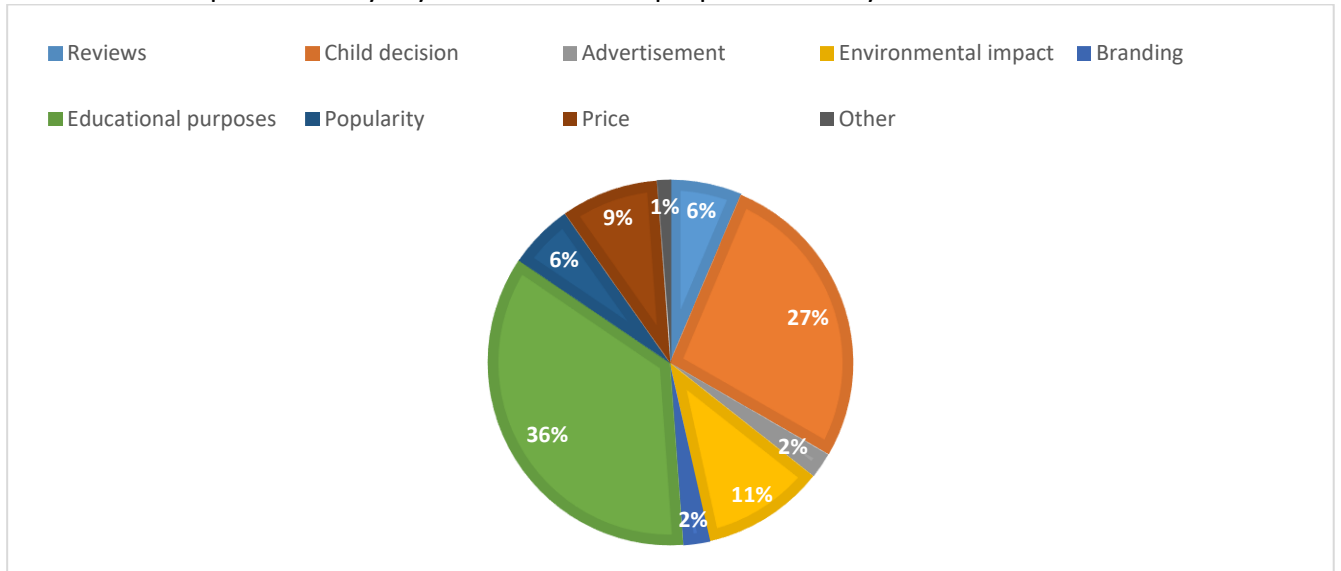
#### What kind of toy do you buy for your children?

- Majority of parents prefer to buy their children educational toys and sports equipment.



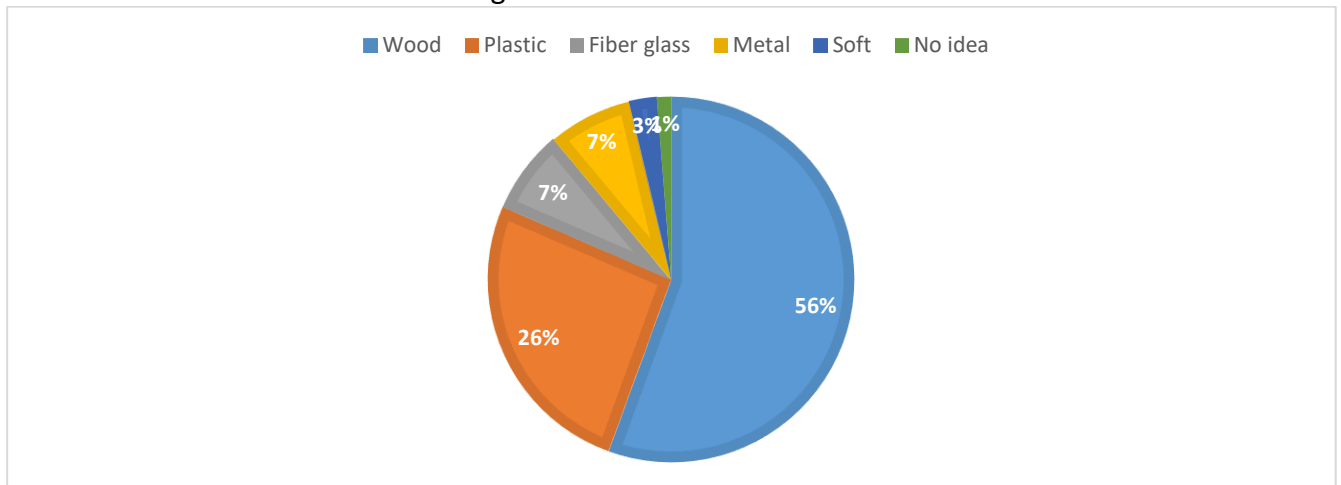
**Reasoning to buy a particular toy:**

- Parents prefer to buy toys for educational purposes and toys based on child’s decision.



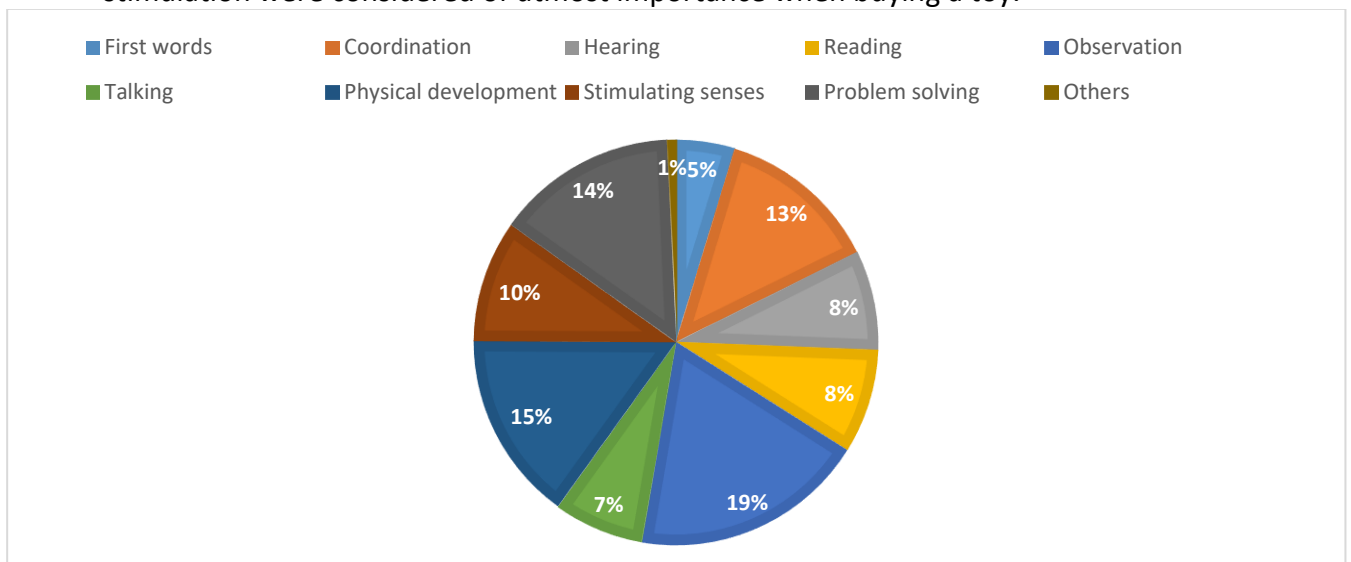
**Suitable material for toys:**

- People prefer to buy toys made of wood and plastic for their children and try to avoid materials like metal and fiber glass

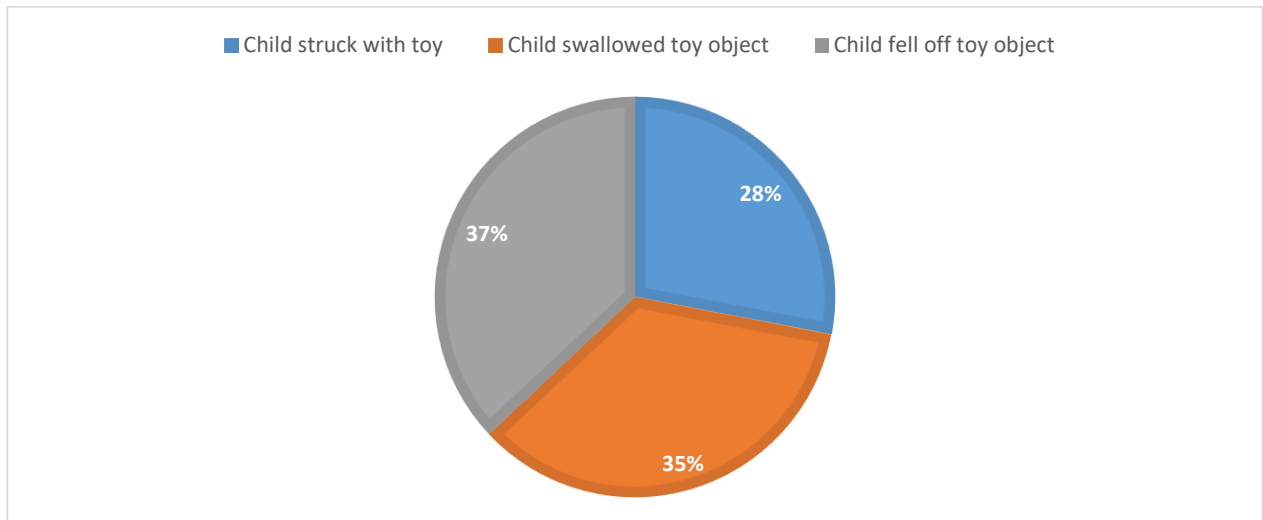


**Important factors considered when buying a toy:**

- Skills like Observation, physical development, Problem solving, Coordination and senses stimulation were considered of utmost importance when buying a toy.



## Occurrence of accidental events:



- Kids are introduced to soft toys first as they are comfortable and soft to play with. They develop a sense of security.
- In need of toy which help the children in overcoming the challenges they would be facing in their next stage.
- Technology can be introduced to kids at around 5 years and ideal age for introducing an educational toy would be around 1-2.5 years.
- Bright colors add positive energy to the learning process
- Kids generally like to play with anything they are provided with. But they develop a sense of comparison when provided with multiple toys and would select their favorite out of the lot
- Sharing and taking turns among children are important.
- Age of black board learning is over. Children need something interactive to play with.
- Children learn more with experience and practice rather than teaching
- They have very less concentration during their early ages, hence it is important to attract them.
- They have a tendency to lose toys or individual parts. Hence a toy should be functional even tough if they might lose some parts.

## Problems with current toys:

- Easily breakable and Difficult to handle
- Hard, heavy and sharp edged
- Toxicity of material and colors used
- Dull looking and Complicated design
- Presence of smaller bodies or objects
- Safety issues
- In need of interactive toys as black board work is boring.
- Lots of mechanism and technology for children to use.

## Conclusion:

The most important thing about educational toys is that, if you choose age-appropriate toys it will assist with a vast number of developmental needs. A child that is exposed to different educational toys will be able to develop sensory, social and cognitive skills and this will help them later in life. The best thing about educational toys is that they can help your child to learn an enormous number of things while they are simply enjoying themselves by playing. Educational toys have real value when it comes to developing a healthy growing child, with excellent physical skills who can think creatively to boot.

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**Appendix-1:****Developmental Milestones****Cognitive development:**

<b>Birth-3 months</b>	<p><b>Month 1:</b></p> <ul style="list-style-type: none"> <li>• Prefers visual patterns over other visual stimuli</li> <li>• Alert 1/10 hours</li> </ul> <p><b>Month 2:</b></p> <ul style="list-style-type: none"> <li>• Visually prefers face over objects</li> <li>• Increased awareness of objects</li> </ul> <p><b>Month 3:</b></p> <ul style="list-style-type: none"> <li>• Visually searches for sounds</li> <li>• Begins exploratory play of own body</li> </ul>
<b>4-6 months</b>	<p><b>Month 4:</b></p> <ul style="list-style-type: none"> <li>• Senses strange people and places</li> <li>• Stares at places where an object is dropped</li> </ul> <p><b>Month 5:</b></p> <ul style="list-style-type: none"> <li>• Begins to play with objects</li> <li>• Explores objects by mouthing and touching</li> </ul> <p><b>Month 6:</b></p> <ul style="list-style-type: none"> <li>• Inspects objects</li> <li>• Reaches to grab dropped objects</li> </ul>
<b>7-9 months</b>	<p><b>Month 7:</b></p> <ul style="list-style-type: none"> <li>• Visually reaches for disappeared toy</li> <li>• Imitates physical acts in their repertoire</li> </ul> <p><b>Month 8:</b></p> <ul style="list-style-type: none"> <li>• Prefers new and complex toys.</li> <li>• Explores weight, textures and properties of objects</li> </ul> <p><b>Month 9:</b></p> <ul style="list-style-type: none"> <li>• Can find hidden objects they saw hidden</li> <li>• Anticipates return of objects and/or people</li> </ul>
<b>10-12 months</b>	<p><b>Month 10:</b></p> <ul style="list-style-type: none"> <li>• Points to body parts</li> <li>• Uses trial and error approach to obtain a goal</li> <li>• Searches for a familiar object but normally in a familiar spot</li> </ul> <p><b>Month 11:</b></p> <ul style="list-style-type: none"> <li>• Imitation increases</li> <li>• Associates properties with objects</li> </ul> <p><b>Month 12:</b></p> <ul style="list-style-type: none"> <li>• Can reach while looking away</li> <li>• Uses toys appropriately</li> <li>• Searches for a hidden object where it was last</li> </ul>
<b>13-18 months</b>	<ul style="list-style-type: none"> <li>• Imitates movements</li> <li>• Uses toys inappropriately</li> <li>• Recognizes self in a mirror</li> <li>• Remembers where objects are located</li> <li>• Uses stick as a tool</li> </ul>
<b>19-24 months</b>	<ul style="list-style-type: none"> <li>• Recognizes shapes</li> <li>• Notices little objects and small sounds</li> <li>• Sits alone for short periods with book</li> <li>• More symbolic thinking allows simple pretend or make believe play</li> <li>• Object permanence is fully achieved</li> </ul>
<b>2-3 years</b>	<ul style="list-style-type: none"> <li>• Match primary shapes and colors</li> <li>• Understand concept of "two"</li> </ul>



	<ul style="list-style-type: none"> <li>• Enjoy make-believe play</li> <li>• Point to body parts</li> <li>• Interested in learning to use common objects</li> <li>• Match objects to pictures</li> </ul>
<b>4-5 years</b>	<ul style="list-style-type: none"> <li>• Able to categorize</li> <li>• Know primary colors</li> <li>• Often believe in fantasy. Accept magic as an explanation</li> <li>• Develops a concept of time</li> <li>• Recognizes relationships between a whole and its parts</li> <li>• Focus on only one aspect of a situation</li> <li>• Base much of their knowledge on how the situation appears</li> </ul>
<b>6-7 years</b>	<ul style="list-style-type: none"> <li>• Longer attention span</li> <li>• Remember and repeat 3 digits</li> <li>• Have difficulty in imagining others point of view</li> <li>• Cannot consistently understand the consequences of their actions</li> </ul>

**Appendix-2:****Developmental Milestones****Physical development:**

<b>Birth-3 months</b>	<p><b>Month 1:</b></p> <ul style="list-style-type: none"> <li>• Movements are mostly reflexive</li> <li>• Keeps hands in fist or slightly open</li> </ul> <p><b>Month 2:</b></p> <ul style="list-style-type: none"> <li>• Gains control over head</li> <li>• Grasping becomes voluntary</li> </ul> <p><b>Month 3:</b></p> <ul style="list-style-type: none"> <li>• Swipes at dangling objects</li> <li>• Can turn over from back to stomach</li> </ul>
<b>4-6 months</b>	<p><b>Month 4:</b></p> <ul style="list-style-type: none"> <li>• On stomach, can support head and chest on arms</li> <li>• Grasps small objects put into hand</li> </ul> <p><b>Month 5:</b></p> <ul style="list-style-type: none"> <li>• May roll from stomach to back</li> <li>• Passes objects from hand to hand</li> <li>• Sits supported for long periods</li> <li>• Researches for toy and successful grasps</li> </ul> <p><b>Month 6:</b></p> <ul style="list-style-type: none"> <li>• May creep on belly</li> <li>• Fascinated with small items</li> <li>• Balances well while sitting</li> <li>• Looks at reaches for grasps and brings objects to mouth</li> </ul>
<b>7-9 months</b>	<p><b>Month 7:</b></p> <ul style="list-style-type: none"> <li>• Holds objects in each hand, may bang together</li> <li>• Hands free while sitting</li> <li>• Pushes up on hands and knees, rocks</li> </ul> <p><b>Month 8:</b></p> <ul style="list-style-type: none"> <li>• Uses thumb finger opposition</li> <li>• Manipulates objects to explore</li> <li>• Crawls</li> <li>• Stands leaning against something</li> </ul> <p><b>Month 9:</b></p> <ul style="list-style-type: none"> <li>• Walks while adult holds hands</li> <li>• Pulls self to standing, gets down again</li> <li>• Explores with index finger</li> <li>• Sits unsupported</li> <li>• Puts objects in containers</li> </ul>
<b>10-12 months</b>	<p><b>Month 10:</b></p> <ul style="list-style-type: none"> <li>• Sits from a standing position</li> <li>• Momentary unsupported stand</li> </ul> <p><b>Month 11:</b></p> <ul style="list-style-type: none"> <li>• Stands alone</li> <li>• Crawls and climbs upstairs</li> <li>• Feeds self with spoon</li> </ul> <p><b>Month 12:</b></p> <ul style="list-style-type: none"> <li>• Cruises around furniture</li> <li>• Walks but may still prefer crawling</li> <li>• May climb out of crib</li> <li>• Has complete thumb opposition</li> <li>• Uses spoon, cup and crayon</li> </ul>
<b>13-18 months</b>	<ul style="list-style-type: none"> <li>• Enjoys unceasing activity</li> </ul>

	<ul style="list-style-type: none"> <li>• Carries objects in both hands while walking</li> <li>• Points with index finger</li> <li>• Picks up small objects with index and thumb</li> <li>• Walks smoothly</li> <li>• Jumps with both feet off floor</li> <li>• Turns pages</li> </ul>
<b>19-24 months</b>	<ul style="list-style-type: none"> <li>• Walks up and downstairs with help of railing</li> <li>• Jumps, runs, throws, climbs</li> <li>• Begins to show hand preference</li> <li>• Walks smoothly, watches feet</li> <li>• Transitions smoothly from walk to run</li> </ul>
<b>2-3 years</b>	<ul style="list-style-type: none"> <li>• Learns to use toilet</li> <li>• Walk backward, stoop and squat</li> <li>• Toss or roll large balls</li> <li>• Dress self with help</li> <li>• Throw balls overhead and kicks balls forward</li> <li>• Brush teeth, wash hands, and get drinks</li> <li>• Full set of baby teeth</li> <li>• Explore, dismantle and dismember objects</li> </ul>
<b>4-5 years</b>	<ul style="list-style-type: none"> <li>• Uses a spoon, fork, dinner knife</li> <li>• Walk straight lines, hop on one foot, run, climb trees and ladders, and turn somersaults</li> <li>• Skillfully pedal and steer tricycles</li> <li>• Buttons and unbuttons</li> <li>• Can cut on a line with scissors</li> <li>• Left or right handed dominance is established</li> <li>• Can skip, jump rope, and run tip toe</li> <li>• Can copy simple designs and shapes</li> </ul>
<b>6-7 years</b>	<ul style="list-style-type: none"> <li>• Develop permanent teeth</li> <li>• Tie shoelaces</li> <li>• Enjoy testing muscle strength and skills</li> <li>• Skilled at using scissors and small tools</li> <li>• Ride bicycles without training wheels</li> </ul>

**Appendix-3:****Developmental Milestones****Social and emotional development:**

<b>Birth-3 months</b>	<p><b>Month 1:</b></p> <ul style="list-style-type: none"> <li>• Eye contact with mother</li> <li>• Spontaneous smile</li> </ul> <p><b>Month 3:</b></p> <ul style="list-style-type: none"> <li>• First selective social smile</li> <li>• Strong interest in looking at human faces</li> </ul>
<b>4-6 months</b>	<p><b>Month 4:</b></p> <ul style="list-style-type: none"> <li>• Returns a smile</li> <li>• Loves to be touched and play peek-a-boo</li> <li>• Smiles when notices another baby</li> <li>• Looks in direction of person leaving a room</li> </ul> <p><b>Month 5:</b></p> <ul style="list-style-type: none"> <li>• Displays anger when objects taken away</li> <li>• Imitates some movements of others</li> </ul> <p><b>Month 6:</b></p> <ul style="list-style-type: none"> <li>• Explores face of person holding them</li> <li>• Differentiates between social responses</li> </ul>
<b>7-9 months</b>	<p><b>Month 7:</b></p> <ul style="list-style-type: none"> <li>• Raises arms to be picked up</li> <li>• Laughs at funny expressions</li> </ul> <p><b>Month 8:</b></p> <ul style="list-style-type: none"> <li>• Responds very differently to strangers than family or caregivers</li> <li>• May reject being alone</li> </ul> <p><b>Month 9:</b></p> <ul style="list-style-type: none"> <li>• Explores other babies</li> <li>• Imitates play</li> </ul>
<b>10-12 months</b>	<p><b>Month 10:</b></p> <ul style="list-style-type: none"> <li>• Displays clear moods</li> <li>• Becomes aware of social approval and disapproval</li> </ul> <p><b>Month 11:</b></p> <ul style="list-style-type: none"> <li>• Seeks approval</li> <li>• May assert self</li> </ul> <p><b>Month 12:</b></p> <ul style="list-style-type: none"> <li>• Prefers family members over strangers</li> </ul>
<b>13-18 months</b>	<ul style="list-style-type: none"> <li>• Imitates housework</li> <li>• Plays in solitary manner</li> <li>• Laughs when chased</li> <li>• Explores reactions of others</li> <li>• Responds to scolding and praise</li> <li>• Little or no sense of sharing</li> <li>• Emotional roller coaster anger to laughter within moments</li> <li>• Children learn to say no to scream and have temper tantrums</li> </ul>
<b>19-24 months</b>	<ul style="list-style-type: none"> <li>• Hugs spontaneously</li> <li>• Becomes clingy around strangers</li> <li>• Imagines toys have life qualities</li> <li>• Enjoys parallel play</li> <li>• Orders others around</li> <li>• Communicates feelings, desires and interests</li> </ul>
<b>2-3 years</b>	<ul style="list-style-type: none"> <li>• Likes to imitate parents</li> <li>• Affectionate: hugs and kisses</li> </ul>

	<ul style="list-style-type: none"> <li>• Easily frustrated, can be aggressive and destructive</li> <li>• Fears and nightmares</li> <li>• Spends much time watching and observing</li> <li>• Seeks approval and attention of adults</li> <li>• Likes to be the center of attention</li> </ul>
<b>4-5 years</b>	<ul style="list-style-type: none"> <li>• Understands and obeys simple rules, but often changes rules of a game as they go along</li> <li>• Persistently asks why?</li> <li>• Can communicate, share, and take turns</li> <li>• More interested in children than adults</li> <li>• Enjoys doing things for themselves</li> <li>• Enjoys dramatic play with other children</li> <li>• Develops best friend</li> <li>• Organizes other children and toys in pretend play</li> <li>• Basic understanding of right and wrong</li> <li>• Good sense of humor. Enjoys sharing jokes and laughing with adults.</li> <li>• Plays simple games</li> <li>• Interested in group activities</li> </ul>
<b>6-7 years</b>	<ul style="list-style-type: none"> <li>• Tends to play with same gender play mates</li> <li>• Strong desire to perform well and do things right</li> <li>• Interested in rules and rituals</li> <li>• Enjoys active games</li> <li>• Sensitive and emotionally vulnerable</li> <li>• Tries to solve problems through emotions</li> </ul>

**Appendix-4:****Developmental Milestones****Language development:**

<b>Birth-3 months</b>	<b>Month 1:</b> <ul style="list-style-type: none"><li>• Responds to human voice</li><li>• Begins small throaty sounds</li></ul> <b>Month 2:</b> <ul style="list-style-type: none"><li>• Distinguishes between speech sounds</li><li>• Makes guttural cooing noise</li></ul> <b>Month 3:</b> <ul style="list-style-type: none"><li>• Coos</li><li>• Responds vocally to speech of others</li></ul>
<b>4-6 months</b>	<b>Month 4:</b> <ul style="list-style-type: none"><li>• Begins babbling: strings of syllable like vocalizing</li><li>• Vocalizes moods</li><li>• Smiles at person speaking to him/her</li></ul> <b>Month 5:</b> <ul style="list-style-type: none"><li>• Utters vowel sounds</li><li>• Watches peoples mouths</li><li>• Responds to name</li><li>• Vocalizes to toys</li></ul> <b>Month 6:</b> <ul style="list-style-type: none"><li>• Vowels interspersed with consonants</li><li>• Vocalizes pleasure and displeasure</li><li>• Responds to sounds of words not meaning</li></ul>
<b>7-9 months</b>	<b>Month 7:</b> <ul style="list-style-type: none"><li>• Tries to imitate sounds or sound sequences</li><li>• May say mama or dada</li></ul> <b>Month 8:</b> <ul style="list-style-type: none"><li>• May learn first words</li><li>• Understands simple instructions</li><li>• Uses 2-syllable utterances</li></ul> <b>Month 9:</b> <ul style="list-style-type: none"><li>• Pays attention to conservation</li><li>• May respond to name and no</li><li>• Uses social gestures</li></ul>
<b>10-12 months</b>	<b>Month 10:</b> <ul style="list-style-type: none"><li>• Obeys some commands</li><li>• Learns words and appropriate gestures</li><li>• May repeat words</li></ul> <b>Month 11:</b> <ul style="list-style-type: none"><li>• Imitates inflection, facial expressions</li><li>• Uses jargon</li><li>• Recognizes words as symbols for objects</li></ul> <b>Month12:</b> <ul style="list-style-type: none"><li>• Practices words he or she knows in inflection</li><li>• Speaks one or more words</li></ul>
<b>13-18 months</b>	<ul style="list-style-type: none"><li>• Points to named objects</li><li>• Has 4-6 word vocabulary</li><li>• Uses 2-word utterances</li><li>• Has a 20-word vocabulary</li><li>• Refers to self by name</li><li>• Spontaneous humming and singing</li></ul>

<b>19-24 months</b>	<ul style="list-style-type: none"> <li>• Likes rhythmic games</li> <li>• Tries to tell experiences</li> <li>• Uses I and mine</li> <li>• Typical expressive vocabulary of 200 words</li> <li>• Repeats words or phrases of others</li> <li>• Uses some short incomplete sentences</li> </ul>
<b>2-3 years</b>	<ul style="list-style-type: none"> <li>• Early 2-3 word sentences, Later 3-5 word sentences</li> <li>• Enjoys simple stories, rhymes, and songs</li> <li>• Hums, attempts to sing, play with words and sounds</li> <li>• Enjoys repeating words and sounds</li> <li>• 75-80% of their speech is understandable</li> <li>• Follows 2-step commands</li> <li>• Swears</li> <li>• Talks about the present</li> </ul>
<b>4-5 years</b>	<ul style="list-style-type: none"> <li>• Recognizes some letters. May be able to print own name</li> <li>• Recognizes familiar words in simple books or signs</li> <li>• Speaks fairly complex sentences</li> <li>• Expressive vocabulary of 1500- 2200 words</li> <li>• Can memorize own address and phone number</li> <li>• May understand 13000 words.</li> <li>• Uses 5-8 words in a sentence</li> <li>• Understands that stories have a beginning, middle and an end</li> <li>• Tells stories</li> <li>• By the end of this age range, children attain 90% of their adult grammar</li> <li>• Can follow 3 step commands</li> <li>• Understands before and after</li> </ul>
<b>6-7 years</b>	<ul style="list-style-type: none"> <li>• Expressive vocabulary of 2600 words</li> <li>• Receptive vocabulary of 20 to 24000 words</li> <li>• May reverse printed letters</li> <li>• Speaking and listening vocabularies double</li> <li>• Becomes interested in reading</li> </ul>

## Appendix-5:

### Questionnaire 1: For Parents

1. What is the age of your child?
2. What is the gender of your child?
  - Male
  - Female
  - Other
3. How does your child prefer to play?
  - Alone
  - With other children
  - With parents or family
4. Do you buy toys for your children?
  - Yes
  - No
5. If yes, what type of toys would you like to buy for your children?
  - Figures (action/animals/cartoons)
  - Educational
  - Electronic
  - Sports equipment
  - Others
6. What makes you as a parent, decide to buy a particular toy for your children?
  - Reviews
  - Childs decision
  - Advertising
  - Environmental impact
  - Branding
  - Educational purposes
  - Popularity
  - Price
  - Others
7. Would you like to buy an educational toy for your child?
  - Yes
  - No
  - Maybe
8. If yes, what is the reason?
9. What do you prefer as the most suitable material for children's toy?
  - Wood
  - Plastic
  - Metal
  - Fiber glass
  - Other
10. Which of the developing skills would you consider to be the most important factors you would look for in a child's toy?
  - First words
  - Coordination
  - Hearing
  - Reading
  - Observation
  - Talking
  - Physical development
  - Stimulating senses
  - Problem solving
  - Others



**11. Do colors of a toy matter when buying it for your child?**

- Yes
- No
- Maybe

**12. If yes, mention the color.**

- Pink
- Blue
- Yellow
- Red
- Green
- Purple
- Orange
- Other

**Appendix-6:**

**Questionnaire 2: For Teachers**

1. Name:
2. Years of work with children:
3. Number of children in your class
4. Average age of children in your class
5. What toys or materials do you like best and why?
6. What toys or materials do you like least and why?
7. What toys or materials do the children like best and why?
8. What toys or materials do the children like least and why?
9. Which of the following toys are there in your classroom?
  - Pegboards and pegs
  - Blocks
  - Puzzles
  - Plastic cars
  - Others
10. List the problems with or as you consider important
11. In your experience, how often have the following events occurred?
  - Child struck with toy (Purposely/ Accidentally)
  - Child swallowed toy object
  - Child fell off toy object
  - Other
12. Do children bring toys from home to school?
  - Yes
  - No
13. Do you believe that the toy makers know enough about children to make toys that are safe?
  - Yes
  - No
14. If yes or no, why?