

# Stage 1 – I Can Hear You!

**Prerequisite: A willingness and interest in having the family enjoy math together!**

## Introduction .....

What a wonderful time watching your young child learn about the world! They are little sponges observing everything going on around them and they can hear you! They play and experiment constantly, making sense of the world and learning how to crawl, walk, talk, and interact with all that they are experiencing.

Mathematics is a natural part of this world they are learning about. No matter what your experiences and feelings about math, this is your chance to make mathematics a playful and fun activity that your family does together.

For now, the main mathematical activity to do together will be exposing your child constantly to mathematical language and ideas. This is mostly just a matter of verbalizing what is going on in your head already. Counting things out loud as you work with them and naming items that your child plays with is what gets everything rolling.

Have fun! This is an amazing time for your family!

## New Ideas in this Stage .....

Here is a quick list of topics that will be covered in this Stage.

- Have fun with math together! This is the most important thing.
- Verbalize math - You do math all the time in your head - include your child by saying those thoughts out loud to your child all the time.
- Point and describe - When you talk about something, point to it and then talk about it. If your child is ready, ask questions about it.
- Expose - Your child is learning by being exposed to things. Your child will probably not understand things initially, but by frequent exposure your child will pick up on the patterns and learn what is going on.
- Count everything out loud. Count up and down. Include 0 sometimes.
- Objects have properties that can be named, described, compared, and discussed. Those properties lead to discoveries of natural and human-made patterns.

### Legal Stuff

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# MATH OUT LOUD

Prerequisite: None

## Math Out Loud – General . . . . .



Activity

**Exposure:** During these early ages, it is all about exposure! Your child is being exposed to a wide array of experiences and is discovering patterns in everything they sense. While exposing your child to the world, expose them to math words and ideas and let them see how enjoyable it can be to play with math together.



**Start early:** Start this even before your child seems to understand what you're saying. Your child is a sponge who is getting more from your words than you realize.

**Point, describe and ask:** Point at things your child interacts with and describe them with words involving numbers, shapes, and colors. If you are dealing with a small set of things, count them out loud to your child. When your child is old enough, point to and ask questions about the things around them.

### Many facets of Math Talk

*There is much more math to talk about than just numbers.*

- *Describe things. Talk about sizes, colors, textures, shapes, softness, wetness, hotness, brightness, and more. Naming and describing properties is essential for comparing them and discovering patterns.*
- *Use comparison words. Bigger, smaller, tallest, widest, more, less, same, ...*
- *Use position words. Over, under, between, near, far, above, ...*
- *Talk about patterns and sequences in space and time. Refer to the order of things as first, second, third, and last. Talk about what just happened, what is about to happen, and things happening today. Talk about patterns in designs you see.*
- *Count things out loud and say numbers to refer to quantities.*
- *Talk about adding or taking away one or two things from a collection.*
- *Use measurement words. Use words like inch, centimeter, foot, meter, mile, kilometer, cup, liter, quart, and more to refer to the sizes of things.*

**This is all math:** These different ways of describing things and their relationships is talking about math! Building up this vocabulary and concepts will help your child develop mathematically, and it will also give a big boost to helping your child read and talk about the world.

# MATH OUT LOUD

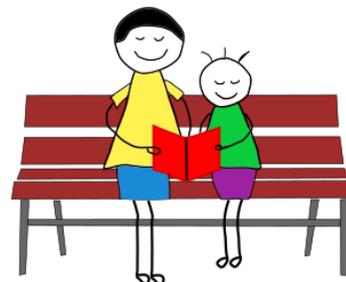
Prerequisite: None

## Math Out Loud – Storytime . . . . .



**It's cozy:** Storytime is a wonderful chance to do a bit of math with your child in a cozy setting. This builds up happy associations with math for you and your child.

**Discuss as you read:** As you read a story with your child, talk about things in the pictures and in the story. If there is a big yellow sun, point to the sun and say: “The sun is round and it is yellow. The wall of this room is also yellow. Point to something round in this room.”



As your child gets older, count together, such as the yellow flower petals in this picture, or ask your child to point to things you describe. In addition to discussing the characters in the story, discuss all the things you would if you were seeing these things in the world around you.

### EFM Storybooks

*EFM provides free picture storybooks as PDFs. Each book has suggested comments or questions to use while reading. Use these same math discussion ideas in your day-to-day activities with your child.*

## Math Out Loud – Home routines . . . . .



**Doing laundry:** When doing laundry, sort by similarities and differences – colors and sizes

**Cleaning up an area:** Which things belong together and why? If you have a box, does it go into, under, over, or inside something else? Do things that are the same shape go together? Is there a special place for round things or triangular things? Which toys belong together?

**Going to sleep and getting up:** Both of these situations lend themselves to discussing doing things in sequence, and practicing words like first, second, third, last, and next. Where do dirty clothes go? How do you decide which clothes you should wear together when you get dressed?

# MATH OUT LOUD

Prerequisite: None

## Math Out Loud – Mealtime . . . . .



Activity

**Cooking:** As you follow a recipe or prepare some food, involve your child in counting out or measuring the ingredients, and talk about the sequence of steps. If they are not ready to do the steps themselves, have them 'oversee' your work.

**Table setting and clearing:** When setting the table, count how many people there will be, and then discuss which things (plate, fork, glass) each person will need. Do some people need different glasses for different drinks?

When you put the food out, how do you figure out how much food to provide? If you have six pieces of fruit for three people, how many should each person get to share it fairly?

When you clean up, are there some things that get cleaned in a different way than others? How can you tell when a lid matches a pot or pan? Which kinds of things get put away in which places?

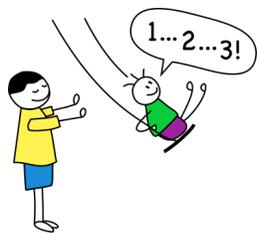
**Putting groceries away:** When putting away groceries, talk about the types of things that go together. Which things need refrigeration? Where do the cans go? Where is there space for the big box? Use lots of relation words such as above, under, around, and between.

## Math Out Loud – Playtime . . . . .



Activity

While playing at home or in a park, there is much mathematics to point out and describe.



**In the playground:** Count the children, the number of swings, the number of steps, or anything else. Comment about where there is more of one thing than another.

**On the swings:** Pushing your child on the swings is a perfect opportunity to count with your child. With each push, count “1, 2, 3, 4, 5.” After your child starts learning how to count to 5, counting down from 5 is also a good idea. Start or end at 0 sometimes.

Point out the circles, curves, straight lines, triangles, and rectangles in the play area. Talk about how some things are over, under, between, or on top of other things.

**At home:** Compare sizes when building with toys or blocks – Which tower is the tallest; Can you make two towers the same height? Describe and compare the sizes, numbers, colors of your toys, animals in pictures, or things you can see outside. If you are making a jigsaw puzzle, describe the shape and color of the piece you need.

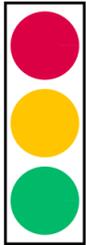
# MATH OUT LOUD

Prerequisite: None

## Math Out Loud – Out and About . . . . .



While you travel, there are many opportunities to talk mathematically with your child.



If you see a somewhat unusual red car, you can point that out and count together other red cars that are like it. Similarly, you might see a big truck and start counting those.

You can ask about bigger, smaller, thinner, and wider things such as buildings, window, trees, and people. Which things are closer than others, and which things are farther away?

**Shapes:** You might see a circle in a design in a building and ask your child to point out other circles they see, such as the circles in a traffic light. Traffic signs and shop signs provide a great supply of shapes you can describe and name.



There is no end to the shapes, colors, and counting that you can find and talk about once you make a habit of looking for them.

## Math Out Loud – Shopping . . . . .



There are many things to count or describe when you shop in a store.

**Counting:** Talk about how many apples you need, and count them out as you pick them out. Count the people in line in front of you, and compare that to the length of the other lines.



**Shapes:** Point out the shapes of fruit or pictures on food boxes. Talk about how some things come in boxes, and other things come in round bottles.

You might need something on a high shelf, or something on a low shelf. There is so much to describe and compare!

# SHAPES

**Prerequisite: None**

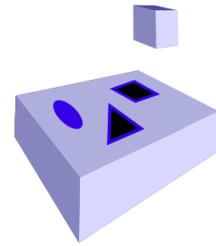
## Shapes Inside Shapes



Help your child explore the physical relationships between shapes by providing an environment rich in opportunities to experiment.

**How to create:** Start with any box – perhaps a cereal box or cardboard shipping box. Cut holes with different shapes (square, circle, triangle, long rectangle) in the box. Watch your child experiment with fitting toys and other objects through the holes.

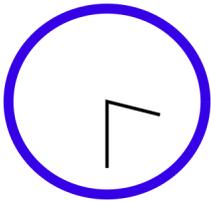
Add different colors to outline the holes (e.g. red triangle, blue circle, yellow square). Reinforce the names by saying the name of the shape of the hole when your child puts the toy through it.



## Shape Hunt



This game is similar to I Spy. It can be played anywhere and at any time.



**The setup:** One person sees a shape, and then gives clues about the object's description and position to the other person.

Player 1: "I see something that has a large blue circle."

Player 2: "Is it that bicycle wheel?"

Player 1: "No. It is in the middle of a wall."

Player 2: "I see it! It's the clock!"

### Variations

*Take turns with your child in the two roles. Being able to give good clues is just as important as discovering an object from some clues.*

*Start with simple shapes, add size and color, and then add shapes inside of shapes or other arrangements. Add in information about its position relative to other objects.*

# SHAPES

*Prerequisite: None*

## Create a Jigsaw Puzzle



Make a jigsaw puzzle together for your child to play with.

Either use a box that already has a picture on it, such as a cereal or product box, or have your child paint or draw on a piece of cardboard or stiff paper.

Cut the cardboard or paper into large pieces and keep all the pieces.

You now have your own personal jigsaw puzzle!

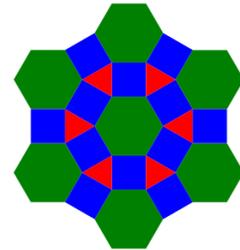
## Colored Tilings



**How to create:** Create a set of “tiles” from cardboard or stiff paper. Use the patterns in the EFM Printables PDF, or download the patterns from a source on the internet. Use one source for all the shapes so that they fit well together. For each shape, use just one or two colors, such as red squares and blue triangles – that will help your child pick up the pattern of which shapes are which, and it will make the patterns more interesting.

Watch your child make patterns fitting the tiles together. Name the shapes and colors as they go.

With older children, talk about patterns in the tiling that repeat. Also, talk about symmetries in the overall design. Some designs have one side that is the reflection of the other side, and that is called **mirror symmetry**.



After your child has made a few designs, start pointing out patterns in the tiled floors and buildings that you see. Brickwork or woodwork often have interesting patterns in them.

# OBJECT DESCRIPTIONS

*Prerequisite: Comfort with basic properties of objects*

## Laundry Sorting .....



Laundry sorting is a great way to discuss properties that make things the same or different.



**Dirty clothes:** Perhaps the clothes need to be sorted by whites, bright colors, and dark colors. Perhaps some clothes need delicate handling, or they are particularly dirty. Perhaps one pile is too big to wash as one group. All of these characteristics are things to be observed, described, and discussed.

**Clean clothes:** You may want to sort into piles by whose clothes they are. Some clothes may be bigger than others. Pairing up socks can be particularly interesting – matching colors, patterns, and sizes.

## Object Hunt .....



Make a math game of searching for objects around the house or outside. Use the game to practice concepts that your child is learning, such as color, size (large, medium, small), weight (heavy, light), quantity, and relationship (inside, on top of, below).

**How to play:** There are two versions of this game. Both versions involve a Puzzler, who thinks of an object to find, and a Guesser, who tries to guess what the object based on the information from the Puzzler.



**Version 1:** The Puzzler starts describing an object, and the Guesser tries to guess what it is.

**Version 2:** The Guesser asks yes/no questions of the Puzzler until the Guesser guesses what the object is.

**How to win:** Guess what the object is in as few steps as possible.

# PATTERNS

*Prerequisite: Comfort with basic properties of objects*

## Patterns . . . . .



Game

Patterns are everywhere! See how many you can make with your child.



### Pattern types

*Here are some characteristics that can be used by themselves or mixed together:*

- *Movement patterns: stepping, jumping, waving, nodding*
- *Sound patterns: clapping, knee slapping, tongue clicking, stamping*
- *Loudness patterns: soft, medium, loud*
- *Visual patterns: color, shape, size*

Player one: makes a pattern and challenges the other person to repeat it. (Step, clap, jump)

Player two: can repeat and eventually add to the pattern, challenging player one to repeat it. (Step, clap, jump, touch their nose)

As you get better, challenge each other to repeat longer and longer patterns from memory.

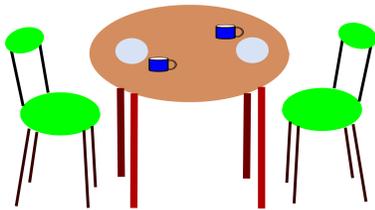
You can use a pattern as a secret code for getting through a passageway. You can also make necklaces with your child by taking string and threading on beads or bits of food to create repeating patterns. Walking hand in hand, you can use squeeze patterns (short short long, etc.).

**Puzzles:** For older children, create puzzles by drawing a pattern of shapes on paper. One person establishes a pattern and then leaves gaps in the sequence for the other to fill in.

# COUNTING UP TO 5

**Prerequisite:** Beginning ability to count from 1 to 5

## Number Hunt .....



**Go hunting:** Pick a number, say 2. Challenge your child to go on a treasure hunt to find as many ways as possible that 2 shows up around you. It may show up as the numeral 2 on a wall, sign, or building. It may show up as two of something, such as two chairs, two dishes, or two cups, as it does in this illustration.

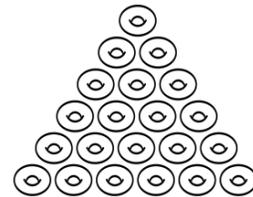
If you like, you can make this into a contest by seeing who can find the most of whatever number you are looking for.

## Number Gobbler .....



**The setup:** Make a 21-piece triangle with some food item. Put 1 piece in the top row, 2 pieces in the next row, and 6 pieces in the last.

**How to play:** Take turns rolling a die. Each time the count of a roll matches a row that is still in the triangle, the player gets to remove that row and either eat it (yum) or put it in their personal pile.



**How to win:** Beginning players can do a 1-to-1 match of the dots on the die with the food pieces in a row. The player with the bigger pile of food wins! To determine the winner, do a 1-to-1 match of the two piles to see whose pile is larger.

### Variation

*Vary the size of the pile to correspond with the range of numbers your child is comfortable with.*

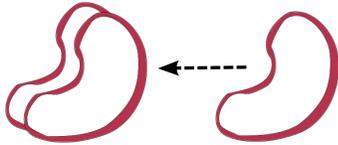
# Numbers up to 5

**Prerequisite:** Can count from up to 5; Number Cards; Sidewalk chalk

## One More One Less . . . . .



Activity



As understanding of the first few numbers grows, ask your child questions about 'one more' or 'one less.' For example, without talking about how many items there currently are, ask "Would you like one more?" or "Would you like one less?"

**Quantity and change:** Slowly, start emphasizing the current quantity and how it changes. Count the number of items together, perhaps two apple slices on a plate. Summarize saying there are two apple slices, and ask if your child would like one more apple slice or perhaps one less. If the amount does change, end by asking how many apple slices there are now.

**Walking around:** Similarly, when you are walking about, pick out things to count. Suppose there are three people in line in front of you. Count them together and ask how many there will be when one leaves and there will be one less.

### Foundations

*Understanding 'one more' and 'one less' helps deepen understanding of how numbers sequence, and it also is the foundational skill for beginning addition and subtraction.*

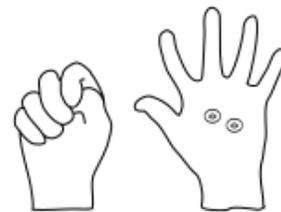
## In the Other Hand . . . . .



Game

**The setup:** Start with a bowl of small pieces of food.

**How to play:** Have your child count out loud a few items from the bowl, say 5, and give them to you. Secretly divide these items between your hands and then hold both hands out with one hand open and the other closed. Your child now counts aloud the items in the open hand and then chooses which hand to "steal" from. Have your child predict how many items will be stolen before you open your hand.



**How to win:** The stolen items become part of your child's pile, and you keep the remaining items. Play continues for as many rounds as needed until the bowl is empty. At the end, you both line up your items next to each other to see who has more.

# MATERIALS

*Prerequisite: None*

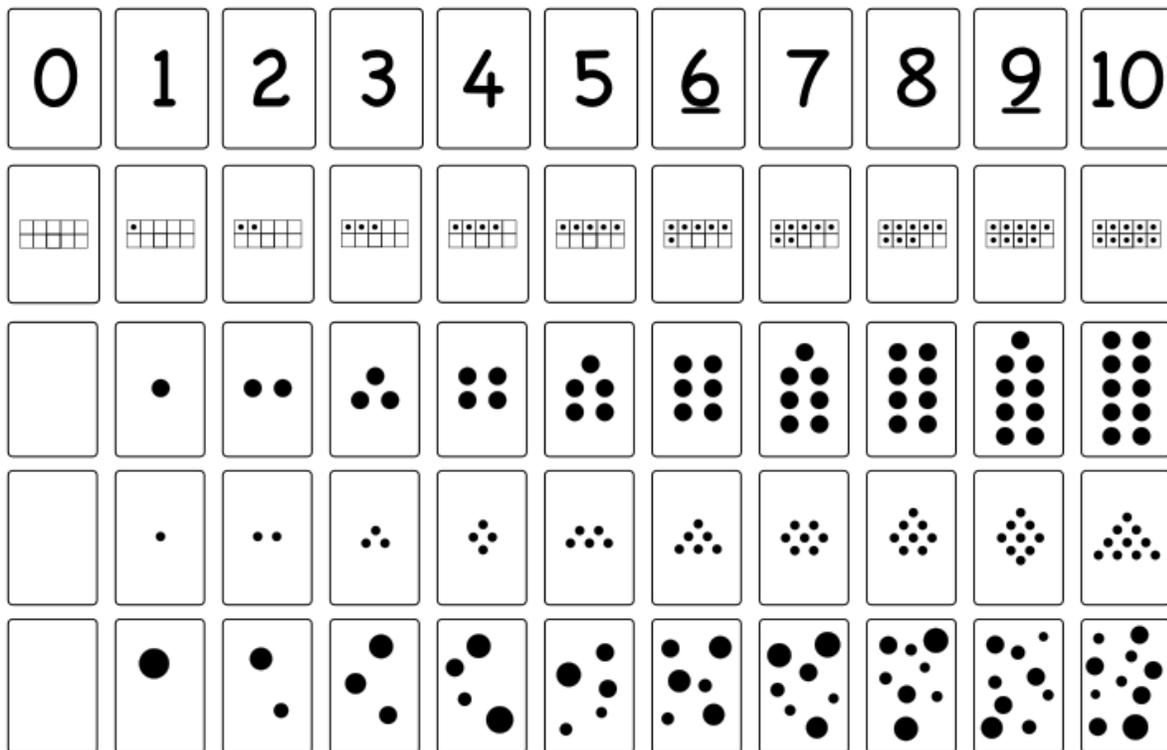
## Introduction .....

You only need a few materials for these Early Family Math activities, and they are all very inexpensive and easy to get. Here's a short list:

- Five dice
- A deck of playing cards
- String (optional)
- Sidewalk chalk (optional)
- Some stiff paper in various colors (optional)

## Make Number Cards .....

Many EFM activities can be played using decks of playing cards. However, using a Number Card deck will help your child practice ideas that will not be emphasized with regular playing cards. Make your own cards using card stock or any thick paper. You can either use the PDF supplied in Resources or draw your own.

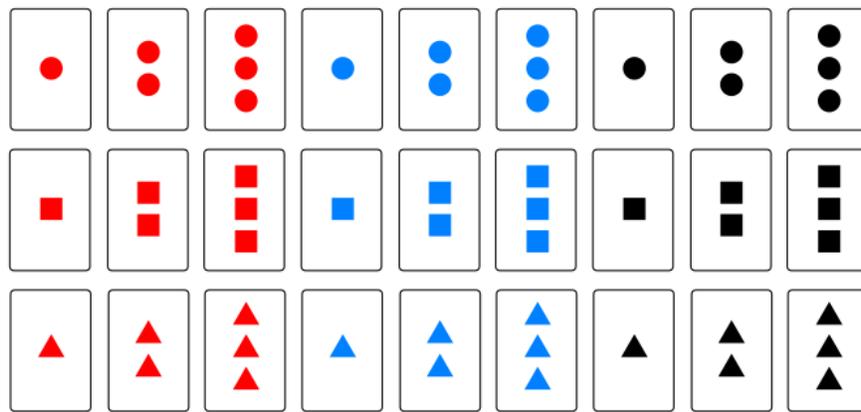


# MATERIALS

*Prerequisite: None*

## Make a Shape Deck . . . . .

There are a few games and puzzles that involve a Shape Deck of 27 cards in the Shape Deck Games page. If you happen to have a set of 81 cards from the game of SET, you can use 27 of those cards that have solid colors as a Shape Deck.

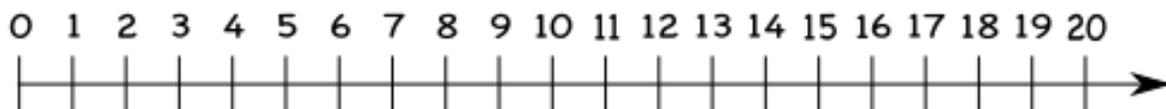


Start with some stiff paper such as card stock if you can. Regular paper will work, it's just not as easy to handle or as durable.

Each of the 27 cards of the Shape Deck has three properties: a shape (circle, triangle, or square), a count (one, two, or three) and a color (red, blue, or black). The 27 cards are pictured above. Use the pdf supplied in Resources or draw your own.

## Number Line on the Wall . . . . .

Place a number line on a wall to let your child see the numbers and how they grow. The number line should start at 0 and go at least to 20, with the numbers increasing as they go to the right. Make it from regular paper and use tick marks and large numbers.



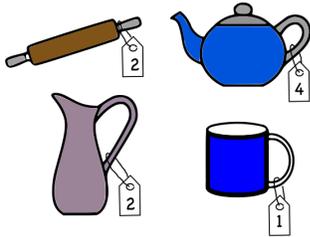
# Numbers up to 5

**Prerequisite:** Can count from up to 5; Number Cards; Sidewalk chalk

## Your Own Store .....



Kids love to play store! Create tags with silly prices that are small numbers. If your child hasn't learned the numerals yet, you can use quantities of dots on the tags.



Put price tags on things in your home (toys, food, books, etc.) Use pieces of paper that have '1' marked on them as pretend money to spend on things in the store.

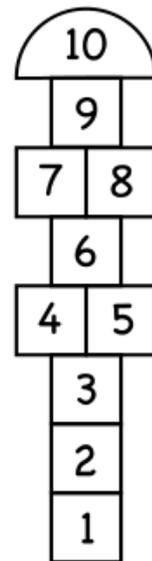
After each 'purchase,' have your child count out the number of bills to pay for it and then count out how much money is left.

## Hopscotch .....



The game of hopscotch provides great counting practice, both forward and backward. Copy this design, or use a simpler one. Use chalk if outside, or masking or painter's tape if inside.

1. Throw a marker into the first square. If it lands on a line, or outside the square, you lose your turn and you pass the marker to the next player.
2. Hop on one foot into the first empty square, and then every subsequent empty square. Skip the one your marker is on.
3. At the pairs (4-5 and 7-8), jump with both feet.
4. At 10, hop with both feet, turn around, and head back toward the start.
5. When you reach the marked square again, pick up the marker—on one foot!—and keep going.
6. If you finished without any mistakes, pass the marker to the next player. On your next turn, throw the marker to the next number.
7. If you fall, jump outside the lines, or miss a square or marker, you lose your turn and must repeat the same number on the next turn. Whoever reaches 10 first, wins.



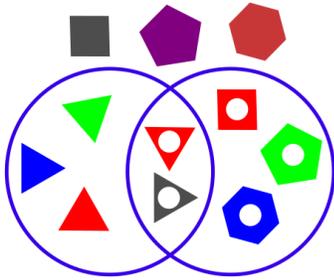
### Simpler variations

*For younger children, relax many of the rules and replace hopping with stepping. Also, use a jumping pattern with fewer squares, perhaps as simple as having the numbers from 1 to 5 in five squares in a row.*

# OBJECT PROPERTIES

*Prerequisite: Comfort with basic properties of objects*

## Going in Circles . . . . .



**A circle for each property:** Create large circles on the ground using Hula Hoops, string, or draw them with sidewalk chalk. Use a collection of objects and have each circle represent a property of some of the objects. Possible properties are: has four legs, is bigger than a doll, has some red coloring. The challenge for your child is to put everything that has the property in the circle and everything without the property outside the circle.

**Two circles:** Start by using one circle to get your child used to the idea. When you change to two circles, make them partially overlap, and choose the properties so that some objects have both properties.

**Example:** For example, if you have a box of blocks, the two properties might be having a round shape and being wooden. Your child should tell you how they are deciding to place each object.

### Variation

*Reverse this activity by placing objects in the circles and challenging your child to identify what property goes with each circle.*

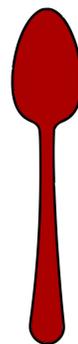
## Same and Different . . . . .



**How to play:** Choose two items that are somewhat similar. How are they similar? How are they different? Allow your child lots of freedom to come up with unusual reasons. Sometimes let your child pick the two items to challenge you to come up with the similarities and differences.

**Example:** Pick a spoon and a fork. They are similar because you eat with them and they are both kept in the kitchen. They are different because one is pointy and one is round.

**Variation:** One variation is to choose an item and ask which things in the room are similar to it and which things are very different from it.



# OBJECT PROPERTIES

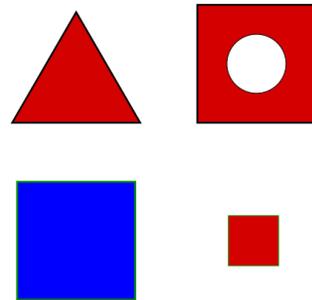
*Prerequisite: Comfort with basic properties of objects*

## One of These is Not Like the Others . . . . .



Use a set of four items or drawings where at least one of the four is the odd one out. Challenge your child to identify one that is not like the others and to explain why. Accept any reason that makes sense; your child may have an unusual reason.

**Example - Shapes:** Suppose the four items are a red triangle, a red square with a hole, a small red square, and solid blue square. The red triangle is the only non-square, the red square with the hole is the only one with a hole, the blue square is the only one that isn't red, and the little red square is much smaller than the others. There isn't always more than one good answer, but you should always be open to surprising ideas.



**Example - Furniture:** Here are four pieces of furniture - there is a round three-legged table, a chair (something to sit on), a piece of furniture with drawers, and a piece with a reddish top.

# DISCOVERING SHAPES

*Prerequisite: Comfort with basic properties of shapes and objects*

## Describing Scenes . . . . .



**The setup:** Make a simple barrier between the two players so they can't see each other's work. Another option is to work back to back. Each person has a piece of paper and the same set of colored pencils, crayons, or pens.

One person draws shapes (such as circles, triangles, squares, and rectangles) in colors and groups in distinctive positions on their paper. That person then gives directions for the other person to follow to make the identical drawing.

At the end, the barrier is removed and the two drawings are compared (usually with lots of laughter). The players compare ideas on which spoken directions worked and which did not.

### Variation

*This can be a 3D activity if each player has the same set of stackable items (such as Lego bricks). In this case, one player makes a stack in some interesting way and then gives a sequence of directions to the other player.*

## Which Shape am I? . . . . .



Have a collection of small shapes, drawings of shapes on cards, or names of shapes on cards. Stick a shape or card on each person's forehead. Ask yes-or-no questions about your own shape until you guess what you are.

## Who is it? . . . . .



This is an activity for several people. The Leader secretly picks one person in the group. To narrow down to the secret person, players ask questions such as, "Is this person wearing a shirt with a triangle on the front?" or "Is this person's hair more than 12 inches long?"