

STEM Activities

(Science, Technology, Engineering, Math)



Through play and exploration babies and young children can naturally develop the skills used in science, technology, engineering and math (STEM). Many of these play experiences will require problem solving, construction, observation, and critical thinking. Exploring the world with your young child, which includes talking about what you see and asking open-ended questions, helps maximize your child's natural curiosity and develops their observation and thinking skills. The discoveries they make strengthen their skills, their brain, and help them make sense of the world. Encourage your child to document observations by drawing a picture, recording their thoughts, and eventually writing about it.

Birth to One Year

Building Materials (Baby Blocks, Stacking Cups)

- Sorting: put the blocks into piles by color. Say "I found a blue block and I'm putting it over here with the other blue blocks."
- Counting: touch each block as you count it
- Shapes: use the shape name and describe it while playing with your baby. "This block is made of squares. Each side is a square. It has four sides that are all the same length."
- Lining up: line the blocks up by color or size. As your baby gets older, line up different colors or sizes to introduce patterns.
- Building: stack the blocks, then have fun knocking them down and rebuilding.
- Sharing: this is a great time to model social skills and saying "please" and "thank you" If your baby reaches for a block or cup, be sure to hand it to them and say something like, "Would you like the block? Here you go."

Ball Play

- Once your baby is a steady sitter, you can try rolling the ball to her and observe what she does. Remember to describe what you see and respond to her babbling.
- She may pick the ball up and put it to her mouth, or drop it. Encourage her to pick it up again.

Documentation (describe your baby's actions and feelings)

- Describe what your baby is doing which expands her understanding and future vocabulary. It also sets the stage for the two of you to share in communication.
- She may respond to your voice, making noises and babbling. Her expressions need to be heard and responded to. You may respond by saying, "You like that ball. I can tell because you are smiling and kicking your legs."
- Keep the back and forth communication going as long as she is enjoying it. She will love having your full attention, seeing your smiling face, and hearing your comforting voice.

One to Two Years

Building Materials (Baby Blocks, Stacking Cups)

- Sorting: put like items into piles by color. Say "Please show me a yellow block. Can you put it by the green one please?"
- Colors: Name the colors; ask the colors. Line the blocks up by color, making simple patterns (red, green, red, green) and point it out to your child. "I noticed there is a red block, then a green one, then another red one."

(One to Two Years continued)

- Building: stack the blocks. Use positional words (on top of, underneath, next to, beside, etc.) to describe the blocks ("The orange block is under the green block.")
- Counting: Count the blocks in the building you create together. Touch each block as you count it. "We used 10 blocks to make this. Do you think we can make one with 12 blocks?"

Ball Play

- Take turns rolling the ball back and forth. Your child needs lots of practice rolling and catching to feel confident about it.
- What happens if we push it harder? What happens if we gently push it?
- Count each roll together out loud.

Documentation

- At this age, your child may begin to use crayons and paper but does not yet have the finger strength and the letter knowledge to write words. But they have many thoughts and ideas that need to be heard and documented. Encourage her to draw and write. Remember young children often use one color even if we offer them another one.
- Ask her lots of questions and give her time to respond. As your child's vocabulary increases her responses will become more detailed and complex. But that doesn't mean you should only ask questions with one-word answers. Try to make many of the questions "open-ended" so your child can explain her thoughts and ideas. Asking "why?" questions, or "What would happen if ...?" questions.
- You can write down her thoughts and read them back to her. Or, record her talking on your phone and play it back for her.

Two to Three Years

Building Materials (Blocks, Stacking Cups)

- Sorting: sort by size, color, shape. Say "I am looking for the triangle blocks. Do you see any triangle blocks?"
- Counting: add and subtract the items. "I need 6 blocks but I only have two. Can you help me get 6 please?" As you child hands you a block, count the group. "One, two, three. Now I have three. How many more do I need?"
- Colors: Name the colors; ask the colors. Line the blocks up by color, making simple patterns (red, green, red, green). Describe the pattern and ask what comes next.
- Building: stack the blocks. Use positional words (on top of, underneath, next to, beside, etc.) to describe the blocks. Ask questions as you build such as, "What will happen if we put this big block on top of this little block?"
- Estimation: "How tall do you think we can make our tower?" "How many blocks will we need?"

Ball Play

- Take turns rolling the ball back and forth. Your child needs lots of practice rolling and catching to feel confident about it.
- Now put something (a shoe, a magazine, a blanket) in the space between the two of you and try to roll the ball. What happens? Talk about it. Listen to your child's explanation and ask questions to encourage him to expand his thoughts and ideas. "Why didn't the ball make it to you?" "What are other ways I can get the ball to you?" "What might happen if we put something else between us?"

Puzzles

- Working puzzles
- Begin by putting all the pieces on the floor, picture side up.

(Two to Three Years continued)

- Encourage your child to try to put a piece in the puzzle. If he is struggling, first describe what he is doing. For example, say "You are putting the piece in with the picture upside down. Is that the way it fits in the puzzle?"
- It is important that your child have the experience of doing it himself, but he may have to watch it being done several times before he figures it out for himself.
- If he becomes too frustrated, put your hand on his and help him put the piece in the puzzle. Use words to describe what you are doing.
- When you complete the puzzle, say "Wow! We did it. We really worked hard to put that puzzle together."

Memory Game

- Find 3 or 4 sets of matches and place them face up in front of your child. Let him explore the cards while you just observe.
- After a few minutes, you might start describing the pictures on the cards your child is exploring. Ask, "Can you find two that look alike?" or pick up one card and say, "Can you find one that looks like this?"
- If your child cannot find a match, demonstrate for him and then let him try again.
- Once your child has matched the sets of cards, begin to play with your child using more sets of matches.

Documentation (for example: chalk, paper, crayon, pencil, measuring sheet, charts)

- At this age, your child may be using crayons, pencils, and chalk to write and may even write a few letters or draw a few shapes. Encourage him to write his ideas and thoughts, even if they aren't yet "readable" to you. His thoughts and ideas need to be heard and documented. You can still write down his thoughts and read them back to him. Or, record him talking using your technology and play it back for him.
- By observing what he is doing, you are able to ask him questions to expand his learning. Remember to give him time to respond. For example, "Can you please help me understand?" Try to make many of the questions "open-ended" so your child can explain her thoughts and ideas. Asking, "I wonder..?" or "What would happen if...?" are open-ended questions.
- If you have participated in Early Birds you may have a clipboard and measuring sheet or chart to use to help document your child's observations.

Three to Four Years

Follow the child's lead. Observe children closely to see what they seem curious about.

Building Materials (blocks, Legos, popsicle sticks, a deck of cards, dominos, rocks and sticks)

- In the Early Birds spring classes you receive several materials to measure things at home. As you and your child are exploring, ask questions to encourage the estimation of size and the need for measurement. For example, "Do you think that board is longer than you are?" or "Does a bird or a person weigh more? Why do you think that?" or "Can you build a tower as tall as the dog?"
- Encourage your child to tell you the steps he took to build a tower or put a puzzle together. Together, write the steps down. Read the steps one at a time and have him follow them to do it again.
- Estimation: "How tall do you think we can make our tower?" "How many blocks will we need?"
- Balancing: experiment with height, weight, size of the object, base
- Ask, "How do we make our tower sturdier or stronger?"

Ball Play

- Take turns rolling the ball back and forth. Your child needs practice rolling and catching to feel confident about it.
- Count each roll out loud. Set a goal. "Let's see if we can roll it back and forth 5 times."

(Three to Four Years continued)

- Listen to your child's explanation and ask questions to encourage him to expand his thoughts and ideas. "What would make the ball go faster?"
- Bowling - set up 5 plastic cups in a row on the ground. Encourage your child to roll the ball at the cups to try and knock one over. Make sure you have a space where things can't get damaged.
- Take turns rolling the ball to knock down cups. Count the number of cups you knock down. "How many are still standing?"
- Change the order of the cups, making a triangle.
- Set a goal. I am going to try to knock down 3 cups this time.
- Write down the number you knock down each time. Add the numbers by counting. "Who knocked down the most in one roll? The least?"

Puzzles and Games

- Sort a variety of everyday objects according to size, color, shape or type. Ask, "How are they different? What do they have in common?" "Which group has the most? The least?" "How many are there in that group?"
- Encourage your child to ask questions and work together to find the answers. Use books and exploration as much as possible.
- Sing songs that have repetition, counting, or rhyming to develop the skills needed for school.
- Pick a sense (See, feel, smell, taste, or hear) and list all the things you can identify using that sense. Take turns. For example, for smell, you might start with "I can smell dinner cooking." Your child might say, "I can smell the dog - he needs a bath." Take turns until you run out of ideas. Then try a different sense.
- Trying to keep your routine will help everyone feel safe. Talk with your child about the activities you will continue to do each day. Have her name them for you. Even if you are using the weekend routine, or creating a new, blended routine, write down the things you do every day in the order you do them. Refer back to it each day to provide structure and a feeling of safety.

Documentation (for example: chalk, paper, crayon, pencil, markers, measuring sheet, charts)

- At this age, your child may be using crayons, pencils, markers, and chalk to write and draw pictures. Encourage him to express his ideas and thoughts this way. It is great practice for school and great exercise for his brain. You can still write down his thoughts and read them back to him but make sure he is doing part of the writing. Then record him explaining his drawing or writing using your technology and play it back for him.
- By observing what he is doing, you are able to ask him questions to expand his learning. Remember to give him time to respond. For example, "Can you please help me understand?" Try to make many of the questions "open-ended" so your child can explain her thoughts and ideas. Asking, "I wonder..?" or "What would happen if...?" are open-ended questions.
- If you have participated in Early Birds you may have a clipboard and measuring sheet or chart to use to help document your child's observations.

Four to Five Years

Follow the child's lead. Observe children closely to see what they seem curious about.

Building Materials (blocks, Legos, popsicle sticks, a deck of cards, dominos, rocks and sticks)

- In the Early Birds spring classes you receive several materials to measure things at home. As you and your child are exploring, ask questions to encourage the estimation of size and the need for measurement. Use a ruler or yard stick if you have it to measure. Then think of other ways to measure. For example, "What can we use to measure how tall the chair is?" Once you have measured it, ask, "If the chair is 20 decks of cards tall, how many decks of cards tall do you think the coffee table is? Let's check."

(Four to Five Years continued)

- Encourage your child to tell you the steps he took to build a tower or put a puzzle together. Together, write the steps down. Read the steps one at a time and have him follow them to do it again.
- Take a picture of your child's creation and ask her to describe it. "What was hard about making it? What surprised her? What would she do differently next time?"

Ball Play

- Take turns rolling the ball back and forth. Your child needs practice rolling and catching to feel confident about it.
- "What can we use to make the ball go faster (e.g., push the ball harder, make a ramp with cardboard or a cookie sheet)?" Talk about it. Listen to your child's explanation and ask questions to encourage him to expand his thoughts and ideas. "What happens if we make the ramp steeper? Less steep?" "Can we make it go up the ramp? How?"

Puzzles and Games

- Play I Spy, Simon Says, or Twenty Questions. These games develop the skills we need to be successful in school and in life. They promote listening, memory, focus, attention, and develop vocabulary.
- Make a movement game and play it together. Make cards with simple movements on them using pictures and words. For example, "Hop on 1 foot 3 times." "Take 8 large steps to the right." "Walk like a duck." Take turns drawing a card and following the directions. To make it more challenging, write some 2-step directions. For example, "Take 2 steps forward and 1 step to the right."
- Sing songs that have repetition, counting, or rhyming to develop the skills needed for school.
- Use this time to explore things in nature such as weather, energy, ecosystems, plants, animals, motion, and life cycles. Read books, search online, observe.
- Pretend play is very important for making sense of the world and addressing your feelings. Find simple props around the house for your child to use during their pretend play. Examples include a calculator, old telephone, a hat, typewriter, pad of paper, tray, apron, and anything else that is safe and might encourage creative play.

Documentation (for example: chalk, paper, crayon, pencil, markers, measuring sheet, charts)

- At this age, your child may be using crayons, pencils, markers, and chalk to write and may even write a few words or draw a few shapes. Encourage him to draw and write his ideas and thoughts, even if they aren't yet "readable" to you. The more he writes, the more letters and words he will learn through his natural curiosity. His thoughts and ideas need to be heard and documented. You can still write down his thoughts and read them back to him. Or, record him talking using your technology and play it back for him.
- By observing what he is doing, you are able to ask him questions to expand his learning. Remember to give him time to respond. For example, "You are adding more water to your mud pie. Why? Or "What are you thinking?"
- Try to make many of the questions "open-ended" so your child can explain her thoughts and ideas. Asking, "I wonder..?" or "What would happen if...?" are open-ended questions.
- If you have participated in Early Birds you may have a clipboard and measuring sheet or chart to use to help document your child's observations.