

# FREE field trip opportunity at Boone County Public Library!

## science in play2go

### Kentucky Science Center comes to you

FREE to schools and families – at Boone County Public Library from December 9, 2017 through March 4, 2018.

Boone County Public Library  
Scheben Branch,  
8899 US 42, Union, KY

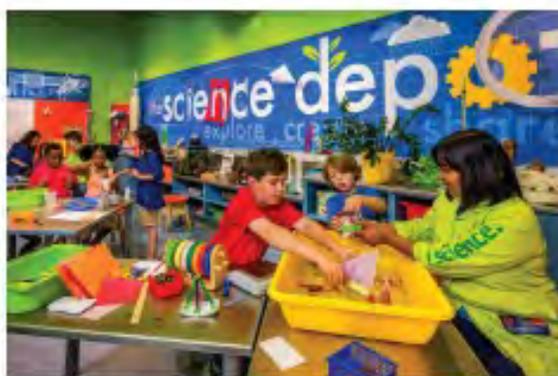
Kentucky Science Center's hands-on exhibit Science in Play2Go uses open-ended play to help develop 21st century skills like curiosity, critical thinking, creativity, and problem-solving and set students up for success in S.T.E.M. fields and in life.

#### Book Your Class Visit Today

Science in Play2Go is designed specifically for ages 8 and under, with program opportunities for students of all ages.

Boone County Public Library will accept one large group per day, Monday - Friday. Please schedule your field trip at least two weeks in advance to ensure everyone in your group has a chance to participate in the interactive activities.

Reserve your time at [www.bcpl.org/forms/science2go](http://www.bcpl.org/forms/science2go). We will contact you to confirm your reservation. Once confirmed, you will receive a teacher packet, schedule for your visit, and bus parking information. For more information contact Chelsea Swinford-Johantges at 342-2665 x8228.



BCPL

# Science In Play 2 Go Field Trip

Boone County Public Library

	Blue Group	Green Group	Purple Group	Orange Group	Red Group
TIME	Science Depot	Light Brite/Ball Fall	Shapes and Stuff	Big Blocks	Roller Coaster
9:00-9:05	Arrival at Noodle Wall				
9:05-9:15	Blue Group	Green Group	Purple Group	Orange Group	Red Group
9:15-9:25	Green Group	Purple Group	Orange Group	Red Group	Blue Group
9:25-9:35	Purple Group	Red Group	Green Group	Blue Group	Orange Group
9:35-9:45	Red Group	Orange Group	Blue Group	Green Group	Purple Group
9:45-9:55	Orange Group	Blue Group	Red Group	Purple Group	Green Group

*Enjoy your visit!*

<b>Time</b>	<b>Blue</b>	<b>Challenges/Activities</b>
9:00-9:05	<b>Arrival</b>	Gather at the Noodle Wall to discuss a few rules.
9:05-9:15	<b>Science Depot</b>	Look at and dig for bones and fossils, examine them and record your findings. (questions and information at each table.) Create a dinosaur with paper plates, do fossil rubbings or dino stamp pictures.
9:15-9:25	<b>Roller Coaster</b>	See how long a track you can build and get the ball to go all the way to the end. Why do you think it stopped where it did? How can you change it to make it go farther? Faster? Divide the pieces equally and make two teams. Build a track and see whose works the best. Why?
9:25-9:35	<b>Big Blocks</b>	How tall a tower can you build? Working together, what is the longest tunnel you can build? Can you build something that has moving parts? A car? Build a fort you can all get inside. Split into two groups and each group gets two shapes - how high can you build? Why?
9:35-9:45	<b>Shapes and Stuff</b>	Check the whiteboards for questions and challenges. Utilize the shopping lists. Assign roles: cashier, stock person, store manager. Use the shapes to draw a picture. (Paper and crayons are at the white board tables.)
9:45-9:55	<b>Light Brite/Ball Fall</b>	How far can you make the ball go? Can you use all the pieces? Why do you think it moved that way? What could you change to make it fall the way you want?

Exhibit Etiquette: Do not throw the exhibit elements or hit each other with them. Be kind and share!

<b>Time</b>	<b>Green</b>	<b>Challenges/Activities</b>
9:00-9:05	<b>Arrival</b>	Gather at the Noodle Wall to discuss a few rules.
9:05-9:15	<b>Light Brite and Ball Fall</b>	How far can you make the ball go? Can you use all the pieces? Why do you think it moved that way? What could you change to make it fall the way you want?
9:15-9:25	<b>Science Depot</b>	Look at and dig for bones and fossils, examine them and record your findings. (questions and information at each table.) Create a dinosaur with paper plates, do fossil rubbings or dino stamp pictures.
9:25-9:35	<b>Shapes and Stuff</b>	Check the whiteboards for questions and challenges. Utilize the shopping lists. Assign roles: cashier, stock person, store manager. Use the shapes to draw a picture. (Paper and crayons are at the white board tables.)
9:35-9:45	<b>Big Blocks</b>	How tall a tower can you build? Working together, what is the longest tunnel you can build? Can you build something that has moving parts? A car? Build a fort you can all get inside. Split into two groups and each group gets two shapes - how high can you build? Why?
9:45-9:55	<b>Roller Coaster</b>	See how long a track you can build and get the ball to go all the way to the end. Why do you think it stopped where it did? How can you change it to make it go farther? Faster? Divide the pieces equally and make two teams. Build a track and see whose works the best. Why?

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<b>Time</b>	<b>Purple</b>	<b>Challenges/Activities</b>
9:00-9:05	<b>Arrival</b>	Gather at the Noodle Wall to discuss a few rules.
9:05-9:15	<b>Shapes and Stuff</b>	Check the whiteboards for questions and challenges. Utilize the shopping lists. Assign roles: cashier, stock person, store manager. Use the shapes to draw a picture. (Paper and crayons are at the white board tables.)
9:15-9:25	<b>Light Brite/Ball Fall</b>	How far can you make the ball go? Can you use all the pieces? Why do you think it moved that way? What could you change to make it fall the way you want?
9:25-9:35	<b>Science Depot</b>	Look at and dig for bones and fossils, examine them and record your findings. (questions and information at each table.) Create a dinosaur with paper plates, do fossil rubbings or dino stamp pictures.
9:35-9:45	<b>Roller Coaster</b>	See how long a track you can build and get the ball to go all the way to the end. Why do you think it stopped where it did? How can you change it to make it go farther? Faster? Divide the pieces equally and make two teams. Build a track and see whose works the best. Why?
9:45-9:55	<b>Big Blocks</b>	How tall a tower can you build? Working together, what is the longest tunnel you can build? Can you build something that has moving parts? A car? Build a fort you can all get inside. Split into two groups and each group gets two shapes - how high can you build? Why?

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<b>Time</b>	<b>Orange</b>	<b>Challenges/Activities</b>
9:00-9:05	<b>Arrival</b>	Gather at the Noodle Wall to discuss a few rules.
9:05-9:15	<b>Big Blocks</b>	How tall a tower can you build? Working together, what is the longest tunnel you can build? Can you build something that has moving parts? A car? Build a fort you can all get inside. Split into two groups and each group gets two shapes - how high can you build? Why?
9:15-9:25	<b>Shapes and Stuff</b>	Check the whiteboards for questions and challenges. Utilize the shopping lists. Assign roles: cashier, stock person, store manager. Use the shapes to draw a picture. (Paper and crayons are at the white board tables.)
9:25-9:35	<b>Roller Coaster</b>	See how long a track you can build and get the ball to go all the way to the end. Why do you think it stopped where it did? How can you change it to make it go farther? Faster? Divide the pieces equally and make two teams. Build a track and see whose works the best. Why?
9:35-9:45	<b>Light Brite/Ball fall</b>	How far can you make the ball go? Can you use all the pieces? Why do you think it moved that way? What could you change to make it fall the way you want?
9:45-9:55	<b>Science Depot</b>	Look at and dig for bones and fossils, examine them and record your findings. (questions and information at each table.) Create a dinosaur with paper plates, do fossil rubbings or dino stamp pictures.
Exhibit Etiquette: Do not throw the exhibit elements or hit each other with them. Be kind and share!		

<b>Time</b>	<b>Brown</b>	<b>Challenges/Activities</b>
9:00-9:05	<b>Arrival</b>	Gather at the Noodle Wall to discuss a few rules.
9:05-9:15	<b>Roller Coaster</b>	See how long a track you can build and get the ball to go all the way to the end. Why do you think it stopped where it did? How can you change it to make it go farther? Faster? Divide the pieces equally and make two teams. Build a track and see whose works the best. Why?
9:15-9:25	<b>Big Blocks</b>	How tall a tower can you build? Working together, what is the longest tunnel you can build? Can you build something that has moving parts? A car? Build a fort you can all get inside. Split into two groups and each group gets two shapes - how high can you build? Why?
9:25-9:35	<b>Light Brite/Ball Fall</b>	How far can you make the ball go? Can you use all the pieces? Why do you think it moved that way? What could you change to make it fall the way you want?
9:35-9:45	<b>Science Depot</b>	Look at and dig for bones and fossils, examine them and record your findings. (questions and information at each table.) Create a dinosaur with paper plates, do fossil rubbings or dino stamp pictures.
9:45-9:55	<b>Shapes and Stuff</b>	Check the whiteboards for questions and challenges. Utilize the shopping lists. Assign roles: cashier, stock person, store manager. Use the shapes to draw a picture. (Paper and crayons are at the white board tables.)

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## Science in Play 2Go: How to Get things Started, Facilitate Scientific Thinking

**Science in Play2Go is not about teaching science. It's about strengthening scientific *thinking*.**

Answering a child's "Look what I did / built / made, etc" with "Oh, that's really nice" says there is nothing more to think or say about they are doing – it shuts down conversation because there is nothing more to be said and shuts down **scientific thinking**.

Scientists ask questions, test solutions, find possible answers, make mistakes and try again. All the activities in Science in Play2Go provide chances to encourage children to think like a scientist – in short promote, enhance, and extend scientific thinking.

**Scientific thinking involves:**

- **Asking questions**
- **Telling what might happen, making predictions**
- **Looking, listening, touching, smelling and tasting to gather information**
- **Organizing, sorting, classifying the information and talking about it**
- **Comparing things and explaining how they are alike and how they are different**
- **Using words to explain why something happened, what might happen, or to describe an idea**

Asking questions that must be answered with more than just "yes" or "no" helps kids to think like a scientist. These types of questions are called **open-ended questions**. Open-ended questions can really get conversations going between you – the teacher or caregiver – and the child.

Example:

"Did you build that?" – This question is a closed question because all that is needed is a yes or no answer.

Instead ask, "Can you tell me about your building?" or "Why did you build it that way?"

Below are examples of open-ended questions or statements you can use in all the different areas of this exhibit to get the conversation going and encourage the child to think about what they are doing and why.

### **Scientific Thinking with Blue Blocks**

Encourage children to use their imaginations when they build, asking questions or making statements about their creation that help them to think about the how and the why.

- Ask them to describe their design, then point to some parts and pieces of their creation and ask what they do e.g., 'What does this do? or 'What happens in here?'
- Practice predicting "What parts would you use to make the creation bigger or taller?"
- Structures can prompt logical, descriptive thinking and communicating "That's a great fort. How many people live in your fort? Where do they sleep? How do they go in and out?" "Why did you build a fort?" "Can you tell me about a real fort that's like the one you built?"
- Encourage the child to think like a person who would live in that fort (this teaches a child to put themselves in another person's shoes and practice empathy.) "Pretend you're a soldier in your fort and tell me a story about you."

## **Scientific Thinking with Roller Coasters**

Help older children develop their ability to figure out how to get the ball to do what they want in order to solve the problem. For example, the ball stops in the middle of the track. What changes need to be made to get the ball to travel to the end of the track? Encourage this problem solving by asking questions. Ask older children to describe their design.

- “How did you come up with that design?”
- “How did you know what parts to choose?”
- “Why did the ball fall off the loop or around the curve?”
- “What parts would you use to make the ball travel farther, or faster?”

Help younger children see why the ball rolled the way it did (the cause “I did this” and effect “then this happened”) and notice patterns in how the ball rolled over the track, then move on to making simple predictions.

- “Tell me how you made the ball roll so fast!”
- “If you did it again would it roll that fast?”
- “Where would the ball go if you started it from here?”
- “Where would the ball go if you added this part?”

## **Scientific Thinking with Lite Brite**

This area allows kids to get creative and stretch their imagination. Help children promote their planning, creating, completing, and describing skills with questions or statements like these:

- “Tell me about your design.”
- “Try making a design with just the red colors.”
- “Let’s line up the colors from dark to light.”
- “Did you spell a word? What word is it? Point out the letters.”
- “How many colors did you use? What are the names of the colors in your design?”

## **Scientific Thinking with Ball Fall**

For little ones, looking and touching as they build pathways and seeing how the ball moves through it helps them define cause and effect. It also helps them notice patterns – every time I use this piece, the ball does this. Help them stretch observing and predicting skills (for very little ones, showing them how to build paths on the wall will help.)

- “Let’s put the ball here and see where it goes. Where will it go if we do it again?”
- “Where will the ball go if we move this up here? How do you know the ball will go there?”
- “Show me how you can build a path.” Ask them to trace with their finger where they think the ball will go.
- “Tell me what happened.”

## **Scientific Thinking with Shapes & Stuff**

Shapes & Stuff helps young children to understand the concepts of shape, color, size, quantity and other mathematical and **visual discrimination skills** (**being able to see the how things are the same and how they are different**). *Since a shape can be anything a child imagines, shapes are the very definition of materials that can be moved, carried, combined, redesigned, lined up, and taken apart and put back together in multiple ways in 'loose parts' play.*

The shopping lists are written to encourage scientific and mathematical thinking, but these questions can enhance the experience:

- “What color is that? Let’s find a color that is lighter or darker than that.”
- “Let’s find shapes to make a color train of dark colors to light colors.”
- “What shape is that? Can you find something near you that is like that shape?”
- “You have all red things in your basket! Let’s sort them from little to big. Now let’s count them.”

Often, the Shapes & Stuff Store will need to be tidied up a bit. Use this time to teach sorting, classifying, and counting:

- “Can you be my assistant and help me find all the red things on the floor?”
- (To a group of children) “Let’s see who can pick up 6 squares, 3 balls and 4 circles on the floor and put them in this basket the quickest.” (Repeat the game with other shapes.)
- “Can you put together shapes to form the number 10? What about the letter E, or O?”
- “How many squares can you count on this shape?” (Hold up a cube.)

Since this is a “store” assign prices to different shapes or numbers of shapes such as “5 squares for \$1.” Run ‘specials’ on certain colors. Give children money to shop with.

- “Green triangles are 5 for \$1. If I give you 2 \$1 bills, how many green triangles can you buy?”

***There are no stupid questions and no wrong answers. The learning is in the discovery, trying things out, seeing what happens, failing and trying again.***

## ***Science in Play2Go is not about teaching science.***

### ***It's about strengthening scientific thinking.***

#### **Blue Blocks**

Help children use their imaginations to create something from their own thinking and to use abstract shapes (like a cube) to represent something real with questions like these:

- Ask them to describe their design, then point to some parts and pieces of their creation and ask what they do e.g., ‘this block is the door’ or ‘this tube is an arm’
- Practice predicting “What parts would you use to make the creation bigger or taller?”
- Structures can prompt logical, descriptive thinking and communicating “That’s a great fort. How many people live in your fort? Where do they sleep? How do they go in and out?” “Why did you build a fort?” “Can you tell me about a real fort that’s like the one you built?”
- Encourage empathy “Pretend you’re a soldier in your fort and tell me a story about you”

#### **Roller Coasters**

Older children will re-create a roller coaster with a design from their own thinking. Help them with problem-solving and experimentation questions.

- Ask older children to describe their design “How did you come up with that design?”
- “How did you know what parts to choose?”
- “Why did the ball fall off the loop or around the curve?”
- “What parts would you use to make the ball travel farther, or faster?”

Help younger children see cause and effect and notice patterns, then move on to making simple predictions.

- “Tell me how you made the ball roll so fast!”
- “If you did it again would it roll that fast?”
- “Where would the ball go if you started it from here?”
- “Where would the ball go if you added this part?”

#### **Lite Brite**

Creating patterns and images with abstract parts exercises imagination and creativity. Help children promote their planning, creating, completing and describing skills.

- “Tell me about your design”
- “ Try making a design with just the red colors”
- “Let’s line up the colors from dark to light”
- “Did you spell a word? What word is it?” “Point out the letters”
- “How many colors did you use? What are the names of the colors in your design?”

## **Ball Fall**

For little ones, looking and touching as they build pathways and observe the ball's path helps them define cause and effect and notice patterns. Help them stretch observational and predicting skills (For very little ones, showing them how to build paths on the wall will help)

- “Let's put the ball here and see where it goes- where will it go if we do it again?”
- “Where will the ball go if we move this up here? “How do you know the ball will go there?”
- “Show me how you can build a path” Ask them to trace with your finger where they think the ball will go.
- “Tell me what happened.”

## **Shapes & Stuff**

From naming shapes and colors, sorting and classifying to counting and measuring or seeing and designing patterns, Shapes & Stuff helps young children acquire concepts of shape, color, size, quantity and other mathematical and visual discrimination skills. Since a shape can be anything a child imagines, shapes are the very definition of ‘loose part's play’: materials that can be moved, carried, combined, redesigned, lined up, and taken apart and put back together in multiple ways. .

The shopping lists are written to encourage scientific and mathematical thinking, but these questions can enhance the experience:

- “What color is that? Let's find a color that is lighter or darker than that”
- “Let's find shapes to make a color train of dark colors to light colors”
- “What shape is that? Can you find something near you that is like that shape?”
- “You have all red things in your basket! Let's sort them from little too big. Now let's count them”
- “Can you be my assistant and help me find all the red things on the floor?”
- (To a group of children) “Let's see who can pick up 6 squares, 3 balls and 4 circles on the floor and put them in this basket the quickest” (Repeat the game with other shapes)
- “Can you put together shapes to form the number 10? What about the letter E, or O?”
- “How many squares can you count on this shape?” (hold up a cube)

# Skills in Play

SiP Skills	Children May...	Adult's Role: Support; Scaffold; Extend
<b>Notice</b>	Listen; look; watch; touch; point; focus; see patterns; look closely at materials and objects; notice sounds; link actions and effects; watch others' activity; pay attention; mimic; find clues; pay attention; con-	<b>Observe the Child.</b> Ask questions. <i>What do you notice? How does it feel? What happened? Look around. Look more closely.</i>
<b>Explore</b>	Play; compare; contrast; sort; analyze information; gather more precise information; look at cause and effect; make relevant connections	<b>Encourage process.</b> Extend exploration. Point out properties, features. <i>"Let's find out." Provide connections to relevant contexts and events. Ask, how are they alike? Different? Make suggestions.</i>
<b>Wonder</b>	Ask questions; express wonder; be curious; recall stored information and past experiences; assess alternatives; have a hunch	Model Curiosity and Wondering. Ask and answer questions. What happened? What else does this remind you of? Convey there are ways to find answers
<b>Imagine</b>	Generate possibilities; connect disparate ideas; apply information to new situations; improvise; play around; invent; pretend	<b>Invite Possibilities.</b> Ask, <i>What if...? What else could you do? What's something you can try you haven't already? If you had a magic wand, how would you change the situation? Ask, How would (friend/sibling</i>
<b>Try</b>	Set an objective; fit together; guess; intentional selection of object or spacing; predict outcome; recreate an effect; make an adjustment; test and compare; use trial and error; try again; persist; intentionally	<b>Support Trying.</b> Reframe a situation or problem. <i>How could we...? Suggest a change/variation. What was different the second time? Ask, What have you already tried? Remove barriers.</i>
<b>Work Together</b>	Cooperate; use others' suggestions; help others; take turns; work together; changing and exchanging roles; ask for help	<b>Work Together.</b> Model cooperation. Play. Cooperate.
<b>Figure Out</b>	Puzzle; reason; use evidence; reflect on what's happening; make a connection; construct new ideas; fit things together; figure out possible solutions; decide what goes next; assimilate a new idea; make	<b>Move Thinking Along.</b> Make suggestions. Invite a more complex action. Set up a challenge. Encourage reflection on experience. <i>Think about what you are doing. Why do you think...? How did you figure</i>
<b>Talk About It</b>	Describe; explain how and why something works; explain what they did, made or discovered; retell in their own words; think out loud; use new words; tell stories	<b>Listen and Respond.</b> Provide relevant terms and words. Suggest, <i>Tell them more about the situation.</i>