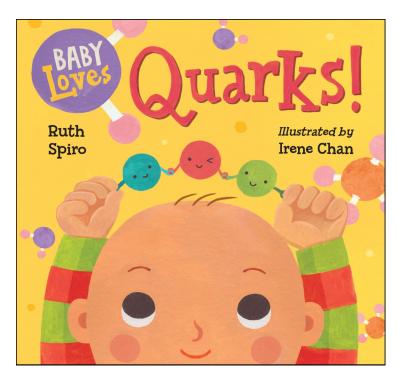
Discussion points and activities to help parents and educators use Baby Loves: Quarks!

To introduce STEM to infants, toddlers,
Preschoolers and kindergarteners
Developed by Marcie Colleen

About the Book

Big, brainy science for the littlest listeners.

Accurate enough to satisfy an expert, yet simple enough for baby, this book explores the basics of particle physics and chemistry—quarks, protons, neutrons, atoms and molecules—and ties it all to baby's world. Beautiful, visually-stimulating illustrations complement age-appropriate language to encourage baby's sense of wonder. Parents and caregivers may learn a thing or two, as well!



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About the Author



Ruth Spiro is an award-winning children's book author and freelance writer whose articles, essays, and stories have appeared in magazines and anthologies. Her debut picture book, *Lester Fizz, Bubble-Gum Artist* (Dutton), won awards from *Writer's Digest* and Willamette Writers and was a Bank Street College of Education Best Book of the Year.

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Author's Note



Hello!

As author of the Baby Loves Science books, my goal is to help make complex science concepts both accessible and meaningful, and also share ideas about how parents and caregivers can turn everyday experiences into fun learning opportunities for their little ones.

Aren't babies and toddlers too young to understand science?

Surprisingly, no. In a recent study at Johns Hopkins, researchers showed 11-month-old babies "tricks" in which a toy seemed to defy gravity. The babies showed a keen interest—their surprise and extended attention was an indication they already have an understanding of basic physics.

According to Roberto J. Rodriguez, Deputy Assistant to the President for Education, "Research indicates that as early as infancy, young children start developing and testing hypotheses for how the world around them works. They understand probability and make predictions. They take in information from trusted sources around them, and use that information to guide their behavior. And all that begins in the first year of life."

But there's no need for flash cards or formal instruction—and especially not for babies! Instead, focus on having fun while adding some beneficial activities to playtime:

- Talk—Name objects, gesture, and describe what you're doing to grow vocabulary
- Sing and clap—A sense of rhythm helps with language acquisition
- Count, match, and sort—These lay the foundation for early math

Most importantly, model a love of learning by sharing observations and asking questions about things you see every day—in other words, think like a scientist. Explore the world along with your child, and have fun making discoveries together!

Ruth Spiro, Author

Ruth Spin





Activity Guide for Infants (0-1 Year)



Infants love to hear your voice, and it's never too early to begin reading together! At this stage, a book is less about the story and more about the tone of your voice, the rhythm of your speech, and the visual stimulation of the pictures.

What Do We See?

Point to the illustrations on each page as you read, naming the objects and colors.

For example:

<u>Animals</u>	<u>Shapes</u>	<u>Colors</u>	<u>Nature</u>
Butterfly	Circle	Yellow	Rainbow
Duck	Square	Blue	Mountain
Pig	Triangle	Red	Carrot
Elephant	Star	Green	Apple
Rabbit		Purple	
Dog		Orange	

Babies LOVE Babies!

Hold up the book and ask, "Where's the Baby?"

Point to a picture of Baby. "There's the Baby!"

Then, cover the picture with a small blanket or burp cloth.

Ask, "Where's the Baby?"

Uncover the picture and say, "There's the Baby!"

Identify the parts of Baby's body, including:

Eyes	Hand	Hair	Mouth
Nose	Feet	Ears	Smile

Jump Start on STEM



Research shows that playing with blocks helps develop motor skills, spatial reasoning, and even early reading ability. Introduce infants to blocks made from cloth or soft foam. Let baby hold a block as you read.

Demonstrate stacking the blocks, encouraging older babies to try stacking on their own. Then, have fun smashing your block towers!

(NOTE: If a block will pass through the inside of a toilet tissue roll, it's a choking hazard and should not be used by a toddler without supervision.)

Activity Guide for Toddlers (1-2 Years)



Many toddlers are ready to take a more active role in story time. They can repeat words, count along with you, and begin to identify shapes and colors.

Reading Comprehension

As you read, ask, "Where is the...?" Your toddler can respond by pointing to the illustration.

<u>Animals</u>	<u>Shapes</u>	<u>Colors</u>	<u>Nature</u>
Butterfly	Circle	Yellow	Rainbow
Duck	Square	Blue	Mountain
Pig	Triangle	Red	Carrot
Elephant	Star	Green	Apple
Rabbit		Purple	
Dog		Orange	

Body Awareness

Point to and name the parts of Baby's body, then ask your toddler to point to his or her own:

Eyes	Hand	Hair	Mouth
Nose	Feet	Ears	Smile



Counting Threes

Three quarks make a proton or a neutron. Create groups of three using toys and items around the house or classroom.

<u>Playtime</u>	Snack Time	<u>Bedtime</u>
LEGO Bricks	Cheerios	Stuffed animals
Building blocks	Apple slices	Socks
Small toys	Small finger foods	Books

Activity Guide for Preschool/Kindergarten (3-5 Years)



Reading Comprehension

Ask questions throughout the exploration of the book. Encourage your preschooler to help tell the story.

- Baby likes to build a tower with blocks. Do you like to build towers? What else can you use to build a tower?
- Nature likes to build things, too. What does nature like to build?

Symmetry

The wings of a butterfly are symmetric, meaning one wing is the mirror image of the other wing. Using LEGO bricks, create a butterfly. Be sure to use the same colored and shaped LEGO in the same spot on each side of the butterfly's body to create symmetry.

NOTE: LEGOs can be considered as a choking hazard, and should not be used without adult supervision.

Exploring Your World

Everything in the world is made up of smaller parts called atoms and molecules. A scientist uses a powerful microscope to see these tiny parts. But we can explore with a magnifying glass.

You can easily make your own magnifying glass if you do not have a real or toy one.

- Take a small, clean cylindrical glass jar with the label removed
- Fill the jar with water to the very top
- Screw on the lid tightly
- Hold the jar on its side and look through it to magnify objects

It's time to explore!

- Experiment with looking at things that would be difficult to see without the magnifier. The patterns on your fingertips are a good example. Can you see something new with the magnifying glass?
- Head outside to get a close up look at objects with tiny parts or details that are difficult to see such as leaves, flowers, shells, etc.

Jump Start on STEM



Research shows that playing with blocks helps develop motor skills, spatial reasoning, and even early reading ability. At this stage, children are ready to build more complex structures with blocks of varying size, shape, and material. Through this play, they are exploring concepts of geometry, symmetry, and measurement.

NOTE: As their structures become more elaborate, children may want to save their work rather than smashing it! Consider designating a spot where their creations may be left undisturbed.