BABY Loves Science

Little books about big ideas

ACTIVITY GUIDE

Table of Contents

Aerospace Engineering	2
Coding	2
Gravity	3
Green Energy	3
Quarks	4
Quantum Physics	4
Structural Engineering	5
Thermodynamics	5
Automotive Engineering	6
Paleontology	6
Meteorology	7
Robotics	7
Word Search	8
Coloring Sheet	9
Matching Squares	10

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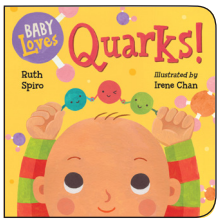

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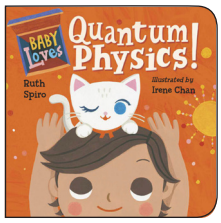

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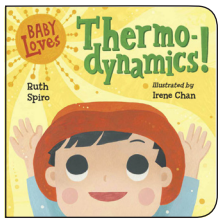

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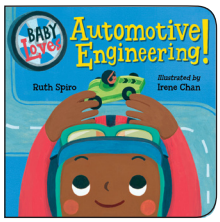

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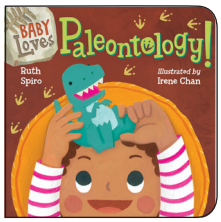

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About the Author

Ruth Spiro is the author of the How to Explain Science to a Grown-Up series, the Made by Maxine series, and the best-selling Baby Loves Science series, which has been praised by NPR, *Today*, *Popular Science*, the *Los Angeles Times*, and more. Ruth speaks regularly at STEM and early-childhood conferences across the country. She lives near Chicago, Illinois.

About the Illustrators

Born and raised in Hong Kong, Irene Chan came to the US to study when she was eighteen. She received her BFA in graphic design from the Savannah College of Art and Desgin. She now lives with her family in Atlanta, Georgia.

Kat Uno is a versatile illustrator and designer who enjoys creating everything from whimsical children's books to accurate scientific diagrams and modern textile designs. She has illustrated many children's books, including the Mermaid Days series.

Baby Loves Aerospace Engineering!

Baby Loves Coding!

Visiting the park

On the playground, encourage your child to observe anything that flies:

- Birds
- Insects
- Passing planes and helicopters

Wonder aloud how these things fly; play a guessing game with your child about where they're going.

Toys and tools

At home or in an indoor play space, make (or if developmentally appropriate, help your child make) and play with a paper airplane. Let your child observe the entire flight process, from windup to launch to landing. Demonstrate how a stronger throw results in a farther flight.

Learning on the go

When flying with your child, read *Baby Loves Aerospace Engineering* while waiting at the gate. Point out to your child the features of the airplane if visible from the gate (fixed wings with curved tops and flat undersides, etc). If possible, encourage them to look out the window before, during, and after takeoff.

Wonderful world of computers

Play "spot the computer" with your child at home or in public places; take turns pointing out something that is operated completely or in part by a computer, such as an electronic toy, a smartphone, a stoplight, a grocery checkout stand, or a car's GPS system.

What are the steps?

As you do a household task with or observed by your child, narrate the steps you're taking to accomplish the task. For example, as you cook dinner, narrate finding the ingredients, turning on the stove, chopping the vegetables, etc. If you have older children, let your Baby Loves Science–age child observe as you teach them procedures like tying their shoes, washing their hands, setting the table, etc.

Musical mastery

Bolster your child's procedural memory with music! Sing "This is the Way" while doing multi-step daily tasks with your child, assigning a verse to each step, for example washing hands:

This is the way we roll our sleeves . . .

This is the way we get the soap . . .

This is the way we scrub, scrub, scrub . . .

This is the way we dry our hands . . .

Baby Loves Gravity!

Baby Loves Green Energy!

Stop, drop, and roll!

Pair your child's delight in gravity with an elementary fire-safety procedure in a rousing game of "Stop, drop, and roll!" Play in a safe, open space with a well-cushioned floor such as a child's gym room with mats or a well-carpeted playroom. Play a fun song while participants wander freely around the room. Then turn off the music and shout "Stop, drop, and roll!" Model the action. Supervise carefully to minimize collisions.

Gravity games

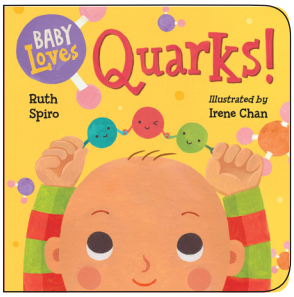
Assemble a variety of child-safe objects (a large stuffed animal, a small stuffed animal, a heavy ball such as a basketball, and a handkerchief or other lightweight floaty object) and help your child to lift and drop them. Mix it up by dropping from different heights (while sitting on the floor, from the top of a staircase, off the side of a couch or chair, etc). Observe together how fast the items drop, whether they bounce at the end, and any other interesting characteristics.

What can baby do?

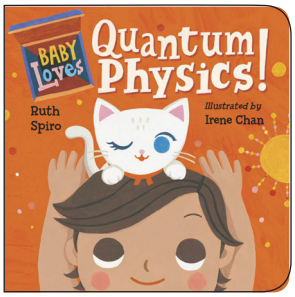
As they occur, talk to your child about daily home procedures that help save energy and conserve natural resources—taking out the recycling, putting vegetable waste in a compost bin, walking or riding a bike to your destination, turning off the lights when you leave the house. Share set phrases like "This saves energy!" or "This helps the earth!"

Earth's blanket

Using an inflatable or similar child-safe globe, act out the story of earth's changing atmosphere as you read *Baby Loves Green Energy* aloud. Start by wrapping the globe in a bedsheet or light summer blanket, then swaddle it in progressively thicker blankets. You can also cast an assistant as the Globe—older siblings may find this a fun activity. Ask baby if the globe is too hot, too cold, or just right as you go.



Baby Loves Quarks!



Baby Loves Quantum Physics!

What's it made of?

Encourage your child to discover the component parts of their favorite things: talk about how tracks plus cars equals a toy train, pillows plus couch equals a pillow fort, or how delicious ingredients come together to make their favorite sweet treat.

Mixing up science

Demonstrate the idea of atoms to your child with homemade Play-Doh! Invite your child to help measure or mix the ingredients for a big batch of fun.

- 1 cup flour
- 1/4 cup salt
- 1/2 cup water
- 3 to 5 drops food coloring

Combine the wet and dry ingredients separately, then slowly add the colored water to the flour-salt mixture, stirring and then kneading until the water is completely absorbed. If the dough is too sticky, add flour until it doesn't stick.

Throughout this process, encourage your child to observe each ingredient closely—compare the size of salt grains to flour grains, watch how the drops of food coloring diffuse into the water, and see how little individual clumps of flour eventually blend into the dough. Where do the flour grains go? Are they still in there, just too small to see? Everything is made up of tiny little pieces like flour grains that you can't see—things we call atoms, which are made of quarks.

Hide the cat

For a fun variation on peekaboo, hide a stuffed cat under a cardboard box and ask your child, "Where's the cat!?" Slightly older children can use this game to practice their directional and positional language: can they put the cat *under* the box, *in* the box, *on top of* the box, *behind* the box, *next to* the box?

Where's the coin?

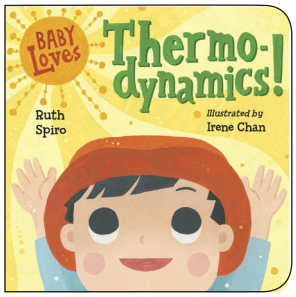
Play a shell game with your child using cups and a coin. Encourage them to guess if the coin is heads or tails before lifting the cup. Wonder together if maybe the coin is both heads and tails until you check.

Hot and cold

Play a classic finding game to build observational skills and reasoning!

- Hide two or three items in a room or backyard and invite your child to seek them.
- If your child gets close, exclaim, "You're getting warmer!" and if they move away, say, "You're getting colder."
- When they are hot, have them guess which item they're near; ask why they think that.
- If they're right, celebrate! If they're wrong, tell them the object is somewhere and keep looking.

Baby Loves Structural Engineering!



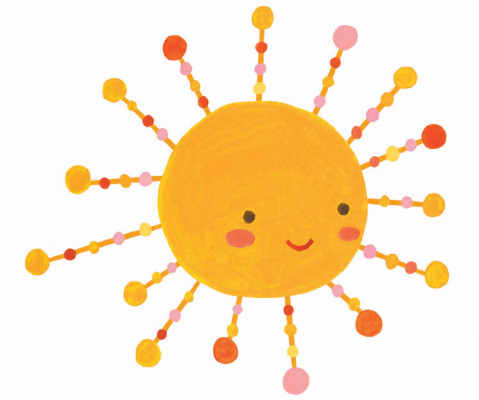
Baby Loves Thermodynamics!

Shapes everywhere!

Point out shapes in the local architecture when you go on a walk or car ride with your child; if developmentally appropriate, take turns naming a shape you see in the environment. You can also play an indoor version of I Spy. Name a shape you see in the room, challenging each other to find the shape. For more common shapes like squares, add specificity like "a red square" or "a tiny square."

Baby builds

As your child plays with blocks, encourage them to experiment with different foundations (carpeted floor versus tiled floor versus sofa cushion versus tabletop). Offer interesting block shapes like arches so that your child can try them out in practice.



Warming up

On a cold day, encourage your child to discover new ways of warming up:

- Cozy sweaters and blankets
- Rub hands together for friction heat
- Drink a warm beverage or eat a warm meal
- Sit close to a heat source like a fireplace or a cuddly pet

Cooling down

On a hot day, encourage your child to discover new ways of keeping cool:

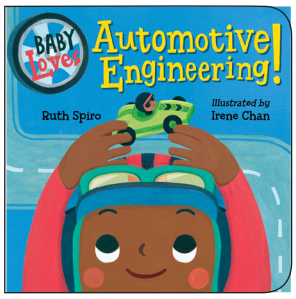
- Drink cold water and stay in the shade
- Wear light clothing
- Go swimming
- Put on a wet bandana

Don't forget the sunscreen!

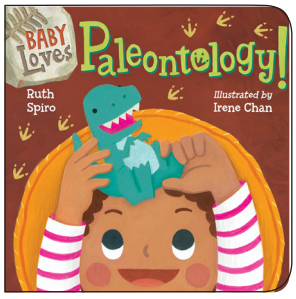
Fuel time!

At mealtimes, talk to your children about how all their food gives them energy—even the veggies!

- Some food gives fast energy that burns quickly and leaves you hungry again (candy, crackers, juice).
- Some food gives slow energy that keeps you full a long time (meat, potatoes, vegetables).
- Where does food get this energy? If time permits, you can extend this activity with a trip to the garden to plant a seed, pick a tomato, and talk about the power of the sun!



Baby Loves Automotive Engineering!



Baby Loves Paleontology!

What's got wheels?

As you go about your day with Baby, point out what kind of wheeled vehicles you encounter. Ask Baby: Which has the biggest wheels? Which has the smallest? Which has the skinniest wheels? Which has the most wheels?

This is how we roll

Starting at the top of a grassy hill, a pile of snow, or a sandy dune, take turns rolling down to the bottom with Baby, then sliding down on a flattened cardboard box. Compare the experiences with Baby: Was it easier to roll or slide? Was it faster to roll or slide?

Push and pull

Encourage Baby to trade off pushing and pulling an item, like a child-sized cart at the grocery store or a toy wagon. Reflect together: Is it easier to push or pull? Why? Is it faster to push or pull?

Bones everywhere!

Every vertebrate animal has bones—including you and Baby! As you go about your day, point out living things and ask Baby if they have bones or not: pets, plants, insects, livestock, and fellow people.

Talk with Baby about how our bones help us. Hard skulls protect our brain, eyes, and inner ears. Teeth help us eat delicious food. Lots of tiny bones and muscles in our feet help us to keep our balance, walk, dance, and run. And ribs help to protect our organs while flexing to let us breathe.

My favorite dinosaur

Look together at the spread in *Baby Loves Paleontology* showing various dinosaurs to scale. Point out the tiny Baby at the far right and think together of modern animals and objects that would be the same size as dinosaurs: horses, cars, even houses! Ask Baby which dinosaur is their favorite. If a favorite dinosaur is not listed, look up illustrations of the dinosaur and its fossils and share them with Baby.

Making tracks

With a tray of wet sand (or a sandbox and a hose), practice making tracks with Baby, using feet, hands, and items like stamps, toys, and tools. As you make prints, wonder aloud how long you would need to wait for these tracks to turn into fossils.

Baby Loves Meteorology

What's the weather?

Make checking the weather a part of Baby's daily routine.

First, bring Baby to a door or window to look at the sky: Is it sunny or cloudy? Is it raining? Is the temperature hot or cold? You can add a little humor by asking your child if you should wear something comically unsuited to the weather: a snowsuit in 80 degree weather, for example, or a swimsuit during a blizzard.

Then check a weather app or news broadcast of the weather report. What's the temperature range for the day? Will it rain or snow later? Invite Baby to help choose an outfit for the day that matches the weather.

Cloud watching

On a cloudy day, go outside with Baby and look up. Make a game of naming the shapes you see in the clouds. Why are the clouds different shapes? Look together at the spreads in *Baby Loves Meteorology* that name different cloud formations. What are the names of the clouds currently in the sky?

Baby Loves Robotics

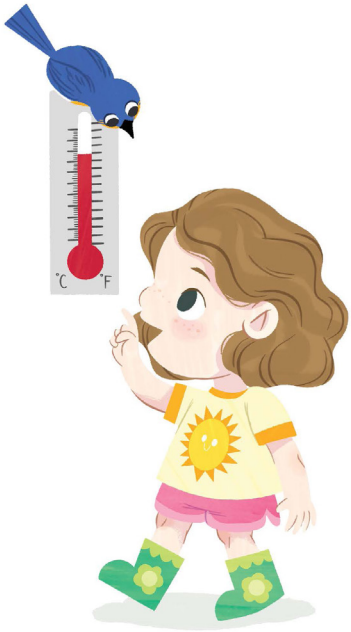
Real-Life robots

Baby may not realize that robots are already a part of their life! Talk together about robots that may exist in your home, city, or other environments: toys, robot vacuums, self-driving cars, and even the automatic car wash.

Don't forget to talk about what makes a robot different from other machines. Your computer, fridge, or manually operated car may be an advanced machine, but it's not a robot.

Biomimicry Baby

Some robots act like animals or plants to do amazing things! This is called biomimicry. Together with Baby, take turns moving like various animals. What do you notice about these different ways of moving? After you've tried several animals, talk together with Baby about which animal you think would make the best robot. Encourage baby to draw a robot that acts like that animal.



Word Search

H B I R D B

N O E S T L

W X U R A O

O N E S C C

D E F W E K

D L O C V Q

BIRD
BLOCK
BOX
CAT
COLD
DOWN
HOUSE
SUN
TREE

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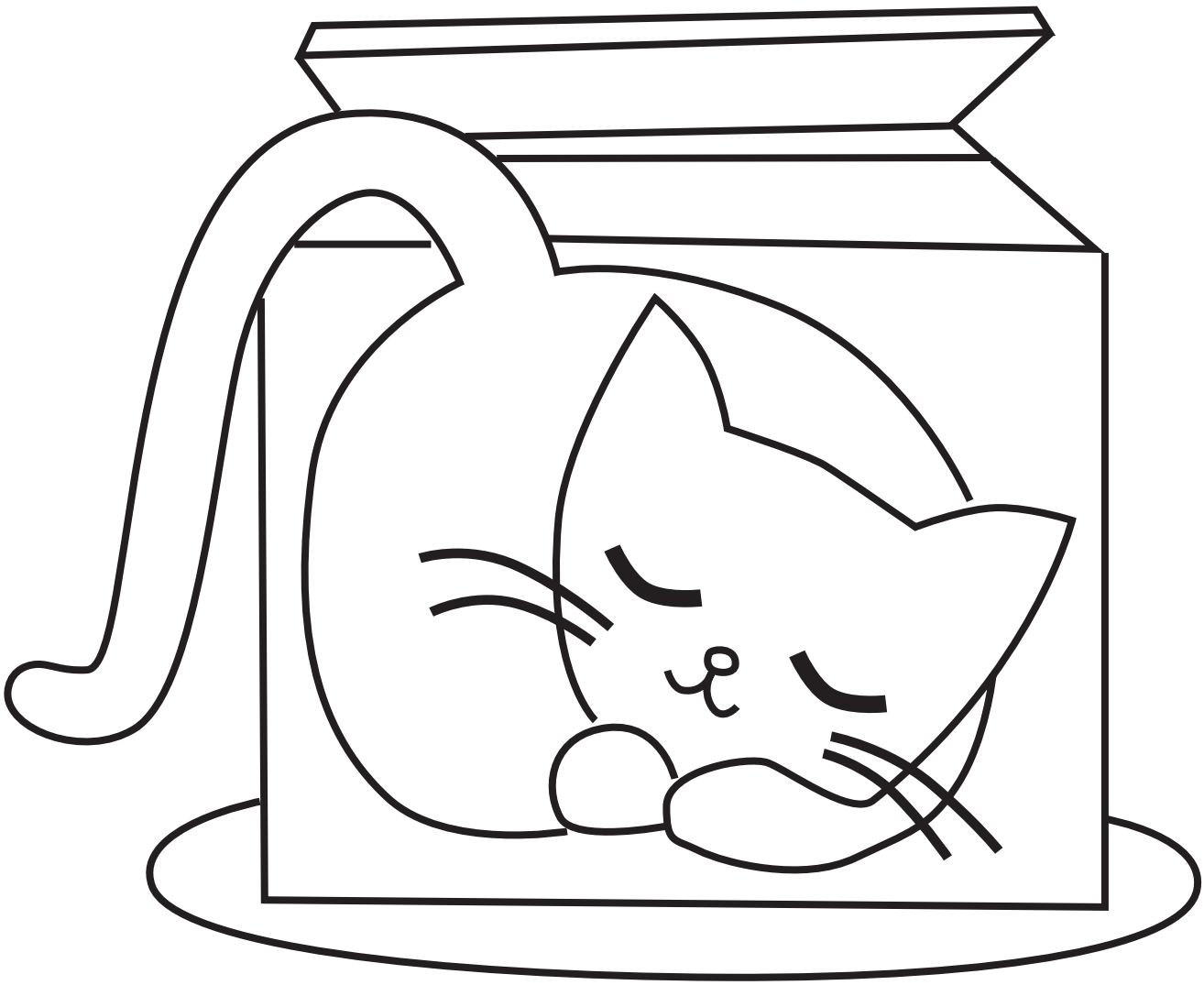
Coloring Sheet



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Matching Squares