Science Is Simple

By Peggy Ashbrook

Illustrations: Marie Ferrante-Doyle

Dedication

To my parents who, as my first teachers, set me on this path
To Helen O'Hear, my kindergarten teacher, who saw my future
To the children, parents, and staff of Valley Drive Cooperative Preschool, "Thank you for doing science with me"
And to Darryl, for his encouragement and confidence in me

Note from the Author

Gentle Readers,
Please write to me. I am interested in hearing your thoughts on teaching science to young children, on this book, and on activities in it. You may contact me at scienceissimple@yahoo.com or through Gryphon House, Inc. at 10726 Tucker Street, Beltsville MD 20705. Thank you for doing science with young children.

—Peggy Ashbrook

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Science Is Simple

Over 250 Activities for Preschoolers

Peggy Ashbrook

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Introduction

Like learning to count or to read, learning how to "do" science is a lifelong process. Children of all ages benefit from exposure to "science" situations. They need to be encouraged to experience the world fully, describe what they see, ask questions about it, repeat the experience, and think about the why of it.

By not doing science from the beginning we give our children the idea that it is too hard to attempt. If we want our children to perform well when they are in high school, we need to include science in their early childhood curriculum.

Exposing the children to pre-experimental activities such as collecting rocks, bouncing balls, reading about dinosaurs and cooking (all science activities), giving them the vocabulary to discuss their ideas, and creating opportunities for them to ask questions and seek answers— all fit into any early childhood curriculum.

It is quite different to learn about something rather than to experience it. Both kinds of these learning activities are appropriate. For example, dinosaurs fascinate many preschoolers; however, it is impossible to experience these creatures firsthand. Yet, fossils of all kinds can be the subject and the basis for a hands-on experience.

Science Happens Every Day

Many everyday activities offer opportunities to focus on a science concept. Pouring juice is a chance to comment on how the fluid always goes down. Noticing that there is a difference between working with dry sand and wet sand, that water spilled on our clothes evaporates, that leaves move in the wind, that a ball rolls down a slope—all of these ordinary occurrences are opportunities to ask questions to focus children's attention on *why* it happens the way it does.

Listen to these preschoolers as they look at and hold roly-poly bugs and slugs. In this everyday experience—looking at bugs outside—they are making observations, classifying, using tools, making hypotheses, counting, describing, and drawing conclusions. In other words, they are doing the work of scientists.

Will	*I see something there.*
Natalia	*Can I hold it? Can I touch it?*
Heather	*I was making it bigger. (Using a magnifier.)*
Miguel	*Look, there's two animals.*
Simran	*It's on your finger!*
Maya	*I like the roly-poly.*
Eric	*Hey, look, there's another one!*
Rhea	*It's just resting.*
Sarin	*It's tickling you, Ja-mante, and it tickled me.*
Rose	*This slug is longer.*
Braxton	*Where is it? Right there! Under the leaf.*
Todd	*I'm a slug. (And he slides all the way back to the classroom.)*
Brooke	*This is what you usually do when you don't want your pet to fall. (As the roly-poly moves from hand to hand.)*

Amila *This one can turn like a ball. (A roly-poly.)*
Joey *These are yucky, gooey bugs. I'm being nice to them.*
Josua *They're looking for something to eat.*

Focus on and repeat everyday experiences, such as working with simple machines. Is there a child who practically empties the liquid soap container every time she washes her hands? Fascinated by the feel of the soap or wondering how the pump works, this child needs to repeat the experience to work it out to her own satisfaction. Fill the container with colored water and let her pump until she's satisfied.

If a child can learn, as even three-year-olds do, to distinguish between and pronounce the names of the dinosaurs, such as Brachiosaurus and Tyrannosaurus, then they can learn the words *solution, ovipositor, reflect, vibration,* and *hypothesis.* Use scientific words when appropriate, and be consistent in your use.

What If You Don't Have an Interest or Background in Science?

The lessons in this book lead both children and teachers to observe everyday happenings in a focused setting. Just as you do not need to be a fire marshal to draw children's attention to a passing fire truck, or a doctor to talk with the children about a recent illness, you do not need to know all the answers before teaching about what you see happening in the world.

Common, everyday experiences, such as watching a bird take flight or blowing bubbles, are the basis for the science experiences in this book. It is your willingness to draw the children's attention to these happenings that is important, not your knowledge or training in science. You do need to be a resource and be willing to model how to look for answers that you do not know. Other teachers and parents are good resources, as are many wonderful science books in the children's section of your local public library. These books explain scientific concepts in age-appropriate language.

Keep this book nearby during the lesson. It will remind you to ask certain questions that the children may not raise. And it will help you remember that most of what happens in science should be the children's job. The teacher's job is to do the groundwork so that the "dominoes" will fall into place as the children do the activity.

When Children Have Questions

Most of the "science moments" you experience with children won't be the only time children will have that experience. They will have other opportunities to build on their knowledge and perhaps come to the same conclusion that an adult does. When a child asks a question, it's best to return the question to them by asking, "What do you think?" After making time for the child to answer the question, you can be a resource for them, as needed.

In addition, encourage children to question everyday experiences. For example, a child might say, "Look at this footprint in the mud! It's probably a bear." Although you know this is unlikely (unless you live in bear country), encourage the child to question, wonder, and guess about this "science moment." Ask some leading questions such as, "How big are bears?" "Where do bears live?" or "What other animals live around here?" before (if you ever do) telling the child, "No, that's a dog's footprint."

What If They Ask a Question I Can't Answer?

Encouraging children to ask questions means that sooner or later one will ask a question you can't answer, at least without doing some research. Telling a child, "I don't know. How do you think we could find out?" will show him not only how he can find answers, but also that it's okay to say, "I don't know." Ask other people and, of course, use the library, which has introductory science books that will provide some answers.

What Size Group Works Best?

It is hard for young children to take turns making observations, asking questions, and sharing their experiences. The challenge is to set up the experience so that every child will have a chance to question, wonder, and guess.

A group size that works for one group, one school, or one teacher may not work for another. Consider the interests and abilities of the children you teach. One or more of the following techniques may work for your group when science is a choice during free play time:

- Try science activities that have no beginning and no end, so children can participate for a few minutes, leave the activity and become involved with something else, but then return to the science activity a few minutes later. (An example of this kind of activity is Magnets and Testing Hypotheses, page 27 or Compost Critters, page 59.)
- Repeat science activities periodically.
- Prepare materials ahead of time and put them on a shelf or in a lidded box, ready to take out when time or interest allows.
- Allow time for extended science activities, as some children will work longer with the materials if they have a particular interest in the subject matter.

Small Groups

If you are able to do science activities with a small group, gather at a table or around a "science circle"—a round tablecloth spread on the floor in an out-of-the-way corner. Explain to the other children that they will have a turn, and it will be more fun for them to share with fewer children, making this tough job of waiting a little easier. If you are able to take the small group to another room, it will allow for uninterrupted focus on the experience and preserve the element of surprise. Not knowing the ending in some lessons can increase the opportunities for every child to hypothesize about what they think will happen. It can also be more fun to have a surprise ending.

Doing science during small-group time is another way to make sure science remains a hands-on experience for all the children. If you have enough materials, all small groups can participate at the same time. And, while the children are having their outdoor time, you can take a small group aside to do one of the outdoor experiences, such as any of the planting experiences, Bubbles (page 203), or Wheels Are Tools (page 198).

At the end of our small-group science time, I use a ritual to signal that science time is over and they have to relinquish the materials. As a group we say the following poem:

All Join In
by Avelyn Davidson
As wide as a gate, (arms and legs stretched out wide)
As tall as a house, (stand tall with arms reaching up)
As thin as a pin, (arms held straight at your sides)

As small as a mouse, (crouch down and squeak)
As bent as a branch, (bend your arms)
As round as a ball, (curve arms with hands touching)
Now stand up straight as that is all. (stand straight and open arms out)
(Permission granted from Shortland Publications 2B Cawley, St. Ellerslie Auckland, New Zealand)

If you are not able to "do" science in small groups, simply break the science lesson down to its parts—the activities. Introduce one or two activities a day over the course of the week to allow all the children time for each part of the experience.

Self-Selected or Teacher-Chosen Groups

It's wonderful to be able to immediately satisfy a child's curiosity and desire to work. Allowing children to self-select to participate in a science activity encourages their interest. But sometimes when you bring out the materials for a new science activity, all the children want to be first. That is when you must choose groups rather than doing science with the children who are first interested, especially if you have limited materials or space.

If you select science groups, try to teach the active children together—the ones who call out their observations first, who bump and jostle, who grab from their neighbors and have no problem telling their neighbors to give it back. They thrive in a group where they don't have to wait for a quieter child to speak or finish using the materials. The quieter children benefit from doing science with children who also wait for someone else to speak first, speak more slowly, or wait to be given permission before doing anything. This gives them the opportunity to be the initiators.

The Scientific Method

Using the scientific method, like using your manners, can become a habit at an early age. For preschoolers, this means encouraging a questioning sense, a desire to find answers, and an ability to come up with a question.

Following the scientific method means focusing attention on what you think will happen, making a prediction even if, for preschoolers, it is a guess. You can help children learn to do this any time you read to them, by asking them to predict what will happen next in the story. Ask children often, "What do you think will happen next?"

In *Creepy Crawlies and the Scientific Method,* Sally Kneidel describes how an activity differs from an experiment:

> *"An activity is simply watching something, or perhaps interacting with it in some way so as to cause a reaction. For example, feeding a live cricket to a praying mantis is an activity. Many people call activities experiments.*
> *But an experiment is an activity that is designed to answer a question and has a control to rule out other interpretations of the result. An experiment is more valuable to a child's learning because it encourages more thinking."*
>
> *(Reprinted with permission of publisher © 1993. Fulcrum Publishing, Inc. Golden Colorado. All rights reserved.)*

Although this level of scientific inquiry, an experiment, is developmentally beyond most preschoolers, they can learn the ideas of hypothesis, procedure, results, and conclusion. When a child formulates a hypothesis, it makes the *science experience* the child's own. Children should get a chance to say what they think will happen before an activity begins and certainly

before an adult speaks. Do not let your eagerness to share phenomena spoil the outcome.

The Scientific Method raises these questions:
*Whose job is it to answer them?

	Question	Who Should Answer
Purpose:	Why are you doing this experiment?	The teacher
Hypothesis:	What do you think will happen?	The children
Procedure:	How will you test your hypothesis?	The children and the teacher
Materials:	What did you use to do the experiment?	The teacher's job is to provide the materials
Results:	What happened?	The children
Conclusion:	Why do you think that happened?	The children

Once you present the activity, keep quiet and allow the children time to come up with a hypothesis, a statement about what *they* think it is or what *they* think will happen. It is your job to wait for children to formulate their ideas. It will become a habit, the more you practice. If the children find a bug on the playground and they ask you, "What is it?" say, "What do you think it is? What is it doing? Where did you find it, on the ground, on a bush?" Encourage them to recognize or build their store of knowledge about the bug.

At times children will want you to act as a source of information for them. When this is clearly what they are looking for, answer the question or help them find the answer in a book.

Science Is Not Magic

An important part of the scientific method is repeating the experiment with the same result. Can another child get the same results? When we experiment with mixing and separating colors, I wait for one child to discover that putting the blue and yellow acetate circles together makes green. Another child may remark, "Hey! Mine does too! Does yours, Saheed? Does yours, Vanessa?" Children learn that science is not magic when they make it happen and can repeat it over and over and over. The result *they* get is not because you have special powers or because you said a magic word, it's because of the nature of the materials. It happens every time you do the same thing. Point out this repetition of results to them during the science experience because they may be so busy with the materials that they may not notice what others are doing.

Be Flexible About What Is Being Taught

Part of the excitement in teaching science to young children is that they often follow their own urges to manipulate the materials and may not imitate the modeled behavior. For example, in making cardboard tube "kazoos," some children will discover that if they blow, instead of humming, the wax paper covering the end will fly off. It may take a few minutes for everyone to try it, dissolve into giggles, and test to see who can send theirs the farthest. This may disrupt the teaching of Sound Is Vibration (page 164), but it's great fun and great science (they are discovering their world!). We want children to notice what is happening; not to sit still and listen to what other people say is happening. That's why the kazoo-making is best at the end of the Sound Is

Vibration lesson. Eventually, everyone wants to achieve both the flying wax paper and the vibrating noise generated by humming. Incorporate children's discoveries into the experience or introduce the materials ahead of time so they have time to get their "sillies" out.

How Much Should I Push the Children to Be Adventurous?

It always amazes me when a child wants to taste a tiny pinch of sand. Part of Making Solutions (page 219) is to look at, feel, and taste water, sugar, and sand to find out what it is, not what we think it is. Remind children that it's safe to use our senses this way because the teacher has planned the lesson and knows what the substances are and that they are safe. Surprisingly, many of the children want to taste the sand and surprisingly, some of them don't want to taste the sugar, even after other children ask for more. Always taste first and then ask, "Who wants to taste the white solid?" Expect many to shout "ME!" Offer every child a taste, but don't try to talk her into it. Respect their cautious approach.

On the other hand, observation should not be the only skill they practice in science activities. Hands-on science engages the senses, a powerful memory tool. A child who consistently won't handle anything on a tray of objects picked for their range of textures can be brought to touch most of them by being given a task. Hand the child the most common, dry, smooth object and instruct him to "Please put this in the box for me." That gives him a way to handle the object for a defined and brief amount of time. Usually the child goes on to touch the other objects. With things that might be "icky," ask all the children to "get one finger ready to touch" so even the most adventurous/least discriminating initially use one finger. It seems that a one-finger touch is a reasonably safe approach and serves to get the cautious child started and out of the watching mode.

Extending the Experience

Will children think about the science activity again in five minutes or remember it later? Yes, especially if you provide the opportunity. By reading one of the large number of children's books that contain a science theme in the story, you encourage children to think again about the science lesson, whether it's about a seed growing, water moving, the way rocks feel in the hand, or what an insect was doing. Extend the experience again on the playground when you point out a similar experience. Each science lesson has suggestions for activities to do ahead and activities to do as a follow-up. The Science Table (or Cart or Basket) is the place to put durable materials related to the experience. Rotate them! Some tools, such as magnifying glasses, should always be available, but don't keep a fossil or the tornado tube bottle out all the time or it quickly loses appeal and thus its ability to teach.

What Materials Are Needed?

The key resource is books, books, and more books: children's literature, non-fiction books on the topic (also helpful as resources for teachers on background information), books on teaching science to young children, and books of experiences/experiments to get additional ideas. Books are the bedrock of your science program.

Found materials, or the throwaways of our culture, are the second most important component. Recycle containers of all kinds, and materials such as cardboard, foam, and fabric into your science

equipment. An oversized plastic jar that held pretzels can be converted into an insect habitat. Mylar plastic bags used to package snack foods are mirrored on the inside. Once emptied, washed and dried, they make flexible mirrors or rockets.

To do the activities in this book, you will have to purchase very few specialized materials. The purchased materials mentioned in the book usually come from party stores, craft stores, school supply stores, and school science supply companies, some of which are listed in the Appendix on page 232.

How to Use This Book

For each lesson, there are directions for the teacher and suggested questions, both of which are designed to guide the children's actions to discovery. Do not make those discoveries for them!

Begin with one lesson. As you gather the materials, think of it as building a library of science materials. The found and recycled materials you gather can be stored for the next year as a kit, each year adding several kits.

The science concepts presented in the activities crop up again and again throughout the year. Think of teaching science as an on-going process; you are never really finished with a topic. You can cover it many times in many ways in varying depth. Sometimes you plan a topic and sometimes the children suggest it. Each science lesson in ***Science Is Simple*** has the following sections:

- Objective(s)
- Science Table
- To Get Ready
- Activities (Materials, What to Do, What to Talk About)
- Follow-Up Activities
- Books to Read
- Bringing Science Home

The objective states what you want the child to accomplish and discover during the activity. The objects on the Science Table give children independent, repeated opportunities to understand the concepts. Contributed objects such as special stones or seeds should be available for examination for a few weeks before being retired to their collection box or sent home. Keeping the materials in the classroom for several weeks provides time for additional child-directed discovery.

The activities, if done in sequence, build on each other. Each activity includes:

- Materials
- To Get Ready
- What to Do
- What to Talk About

A day or a week before you want to begin the science lesson, do the "To Get Ready" section, which introduces the topic or concept. Initiating a conversation about insects, for example, gives the children plenty of time to tell their own insect stories before experiencing Crickets and Using Magnifiers (page 55).

The "What to Do" and "What to Talk About" sections for each activity give step-by-step instructions and open-ended questions to lead the children to discovery. You and the children may discover the information (which is in parentheses), or you may decide to tell it to them. To help children begin to answer their own questions about what is going on, frequently ask them to describe what they are experiencing.

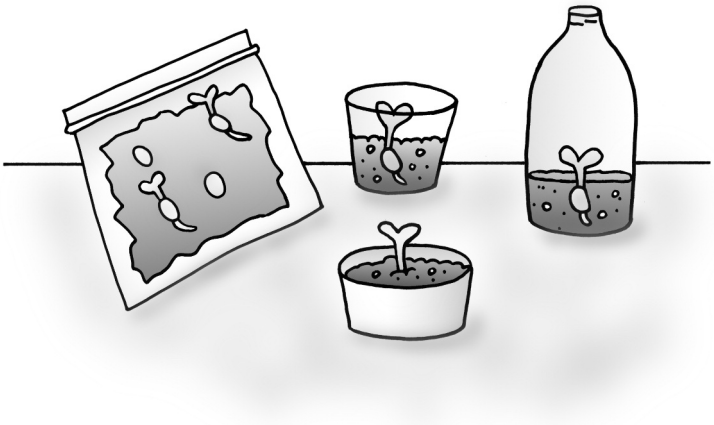
Follow-up activities present the same concepts in a different way, often with materials that the children can handle independently. For example, keeping a terrarium of crickets in the classroom will give the children many more chances to continue observing insects. A Science Table is the perfect place to put the materials for the follow-up activities and to leave them out for a few

weeks. Children may gloss over familiar objects so, unless you intend to make the crickets the classroom pets, rotate them out and let the Science Table objects from the next lesson take their place.

Reading the suggested books, or just having them available for the children's use, gives the children a chance to casually notice facts about the topic or see the concept in the context of everyday life. Body parts unique to insects are much more easily identified when the children have pored over the photographs in an insect identification book before seeing the live insect. This careful groundwork sets the stage for more focused attention during the lesson and integrates the activities into the day instead of it being an isolated activity.

"Bringing Science Home" offers letters to families to inform them about what their children have been doing in the classroom and to invite their participation.

Children want to handle everything themselves, and they enjoy repeating the activities. When possible, provide one of everything for each child. Keep in mind that the goal is to have the children make observations, gain information, and come to conclusions through their use of the materials. It may take longer than just one activity, one lesson, or one day.



Think of each science lesson as a recipe—a recipe in progress, because every time the children do the activities, they will teach you new ways of presenting and using the material, and new questions to ask and seek to answer.

Getting Started—The First Lessons

A good place to begin is the lesson on children's literature to teach the scientific method (pages 24-26). This will give you practice asking (but not answering) the children's questions, and give them practice answering them. Other experiences that introduce the tools of scientists are Measuring Hands (pages 224-227), Crickets and Using Magnifiers (pages 55-58), What Is It? (pages 122-125), and Magnets and Testing Hypotheses (pages 27-32). For young preschoolers, the experiences about our senses are a good way to draw them into science. Mixing and Separating Colors (pages 190-193), Sound Is Vibration (pages 164-168), Our Sense of Smell (pages 194-197), and Our Sense of Touch (pages 186-189) involve activities that take about five minutes but can last for 30 or more minutes as some children repeat the activity over and over and some children just drop by for a few minutes.

Or, begin with a topic that is your favorite or one that reflects the children's current interests. Of course, try the activity before you do it with the children. Try it with your co-teachers and all of you will be one step ahead. Many of the science lessons can become science kits if you store the materials together. On the outside of the box, inventory the materials in the box and list those you must gather new each year.

Science Is Simple

A Year of Experiences

Please note that the suggested time and location for presenting the experience are based on the weather in the Washington, DC area, agricultural zone 7.
The seasons may occur earlier or later where you live.

Suggested season for doing the experience	Title of the experience
first quarter	Using children's literature to teach the scientific method
first quarter	Magnets and testing hypotheses
early Fall	Year-round gardening
early Fall	Planting strawberry plants
early Fall	What do seeds need to grow?
Fall	Why do some tree leaves change color?
Fall, outside	Stretch your senses on a walk to a nearby park
Fall, before the frost	Crickets and using magnifiers
Fall, before the frost	Compost critters
Fall, before the end of October	Planting spring bulbs
Fall	Corn and an introduction to the globe
Winter	Winter birds
Winter	What is melting?
Spring	What can the wind do?
February, outside	Planting peas on Presidents' Day
by April 15	Waiting for mantises to hatch
Spring	A tree is nice
Spring, outside	Dirt, what is it?
by May 1	Butterflies change as they grow
late Spring, outside	Planting a butterfly garden

Additional Lessons for Any Time of Year

Title of the experience

What is it?
Rocks that are made of tiny pieces (sedimentary)
Rocks that were melted (igneous) and volcanoes
Fossil discovery
Mirrors reflect
Working with pumps, siphons and capillary action
Taking note of volume
Evaporation and condensation
Sound is vibration
Making a chemical reaction to create slime
Eating sunlight (outside in sunshine)
Objects in motion
Our sense of touch
Mixing and separating colors
Our sense of smell
Wheels are tools (outside)
Bubbles
Recycling paper to use again
Rocket ships blasting off
Making solutions
Measuring hands

EVERYDAY Science Lessons

Each science experience has several activities, which, if done in sequence, build on each other. Doing everything from "To Get Ready" to "Follow-Up Activities" will give children repeated opportunities to understand concepts. The individual activities can be used separately, and children often want to repeat their favorite activities.

Using Children's Literature to Teach the Scientific Method:

Encouraging Children to Make Predictions While Reading a Book

OBJECTIVE

To help preschoolers and their teachers take the first step to using the scientific method

WHAT IS THE SCIENTIFIC METHOD?

The scientific method is a way of figuring out what question to ask, what steps to take to answer that question, then doing our best to make sure that the information gathered is not biased. The scientific method, like manners, can become a habit at an early age by expecting children to come up with questions and then to find answers to those questions.

Following the scientific method entails exploring a situation, focusing on what you think might happen. This is called making a hypothesis or prediction (or in the case of preschoolers, a guess) about what might happen. One way to help children develop the skill of predicting (or guessing) what might happen is to ask them to guess what will happen next when you read them a book. Then follow up by asking them if things turned out the way they thought it would. Make it clear that you want the children to make predictions and that you will respect and accept all answers (and not provide any).

Materials

Fortunately by Remy Charlip

What to Do

1. Any book will do, but *Fortunately* by Remy Charlip is particularly well suited to getting children started thinking about what happens next in a book, noticing patterns, and asking questions.
2. Read the first few pages during story time. Stop after the pattern of alternating happy/sad pages has been repeated two or three times.

Each science experience has several activities, which, if done in sequence, build on each other.
Doing everything from "To Get Ready" to "Follow-Up Activities" will give children repeated opportunities to understand concepts.
The individual activities can be used separately, and children often want to repeat their favorite activities.

3. Ask the children:
   - What do you think will happen next?
   - Will it be a happy page or a sad page? What will he do?
4. Turn the page and find out what does happen. Ask the children:
   - Is it a happy page or a sad page?
   - What is happening?
   - Is this what you thought would happen?

Repeat steps two and three as long as the children are interested.

What to Talk About

1. After children practice the skill of predicting what might happen next when you read books to them, build on this skill during science experiences. After children have explored materials, ask them,
   - What do you think will happen?
   - Why do you think that will happen?
2. Ask other leading questions to help them make predictions and hypotheses. For example:
   - If I throw this ball up to the sky, where do you think it will stop?

   Follow up with:
   - Did it happen the way you thought it would?
3. Give children a chance to say what they think will happen before an activity begins and before adult opinions are voiced. Also give them opportunities to describe what they saw happen, and why they think it happened that way. For example, if the children find a bug on the playground, after you ask them what they think it is, ask:
   - What is it doing?
   - Where did you find it, on the ground, on a bush?

Encourage them to recognize or build their store of knowledge about the bug.

4. At other times, children will want you to act as a source of information for them. When this is clearly what they are looking for, answer the questions or help them research it with you using a book.

Books to Read

Almost any book will do if you remember to ask, "What do you think will happen?"

Fortunately by Remy Charlip

How to Think Like a Scientist: Answering Questions by the Scientific Method by Stephen Kramer, illustrated by Felicia Bond

Suddenly by Colin McNaughton

Website to Visit

www.enc.org/focus/lit–Eisenhower National Clearinghouse, see *Focus,* a magazine that helps educators incorporate children's literature into math and science curricula.

Bringing Science Home!

A Note Home to Families About Reading Books to Your Child to Promote the Scientific Method

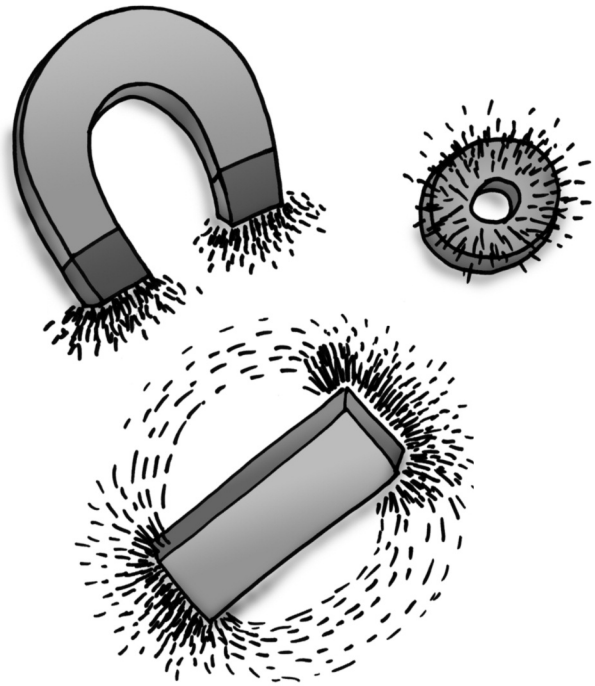
Dear Families,

Does preschool seem a little early to be talking about the scientific method? It is never too early to develop children's ability to learn how to ask questions and support their desire to find answers, which is part of the scientific method.

What is the scientific method? It is a way of figuring out what question to ask, what steps to take to answer that question, and then to doing our best to make sure that the information gathered is correct. The scientific method, like manners, can become a habit at an early age.

Following the scientific method means focusing attention on what you think will happen, making a hypothesis or prediction (or in the case of preschoolers, a guess). We can help children learn to do this any time you read to them, by asking them to predict what will happen next in the story. At the end of the story, ask them if things turned out the way they predicted. Be clear that you want your child to predict (or guess) what might happen and that you will respect and accept all answers. Their answers do not have to agree with yours.

Magnets and Testing Hypotheses



Magnets are fascinating to explore. Their power is mysterious to us because we cannot use our senses to figure out how they work. Through repeated exploration preschoolers can become familiar with the action of magnetic force, and realize that it is not like the magic in storybooks that needs a special person or special thing to work. Everyone can use a magnet and the magnet will always attract some objects and not others. Magnetic force operates in predictable ways.

OBJECTIVES

To experience the force of magnetism
To introduce the concept of making a hypothesis

SCIENCE TABLE

Put a clear container of iron filings and three magnets of different shapes on the Science Table. Keep them out for a few weeks, or as long as you are exploring this experience with the children. The children can move the filings around within the box or put the magnets on top to see the direction of the magnetic field (as seen in the way the filings line up).

TO GET READY—

Introducing Magnet Play

Materials

variety of magnets—some with handles, horseshoe, and bar
objects made of various materials
sorting trays

What to Do

1. To allow children time to form their own ideas, let them explore the properties of magnets, including what types of objects are attracted to magnets. Put magnets, a variety of objects made of different materials, and sorting trays on the science table for children to explore.
2. Ask children about the properties of magnets, such as:
   - How do they attract objects?
   - Do all the magnets attract the same things?
   - What kinds of things do they attract?
   - Will the magnets work in other places, such as the water table or refrigerator?

- What are you doing with the magnet?
- How is that object sticking to the magnet? Did you use glue or tape?
- What else will be attracted to the magnet?
- Why are those objects attracted to the magnet?
- What do you think will happen if we touch the two magnets together?

Feeling Magnetic Force

Materials

doughnut magnets
pencils

What to Do

1. Introduce magnetism by giving each child two doughnut magnets slid onto a pencil so that the force of magnetism pushes them apart.

What to Talk About

1. Ask:
   - Can you make the two magnets stay together?
   - What is happening with the magnets?
2. The children will discover many fun ways to manipulate the magnets. Ask:
   - Can you feel the force of the magnetism when you pull the magnets apart or push them together?
3. One property of magnets is that they attract some objects. Just like one property of water is that it is wet, magnets have magnetic force—the property of attracting some objects to it. The force called magnetism happens when the atoms in the magnet line up. Although we cannot see them lined up, we can experience what happens to objects near the magnet.