I. INTRODUCTION

A. Making Science a Familiar Career—We want children to see being a scientist as a career option from a young age. Young children tend to want to be what they know...they want to do what their parents do or they want to do a familiar career...nurse, teacher, fire fighter, police man, etc. Let’s try to have young kids understand what a scientist does so that it becomes something they know and might want to be.

B. Science is Everywhere - Science is happening around us all the time, it is simply a matter of pointing it out to the students. When a kid throws a ball in the air, point out that it comes back to earth because of gravity. When you wipe the table down before snack, point out the way the remaining water evaporates. Why does the wind blow? Why does wet sand make better castles? Why do the leaves fall off the trees? Why did juice drip off the table? Everything has a scientific explanation.

C. Questioning Everything – We want to encourage children to think like scientists, question the world, search for their own opinions, and try to figure out how or why things are as they are.

II. EVERYDAY TERMINOLOGY AND SCIENTIFIC THINKING

A. Terms to use – encourage scientific thinking throughout the day using these terms.

i. **Hypothesis** (plural: Hypotheses) – A tentative explanation for an observation, phenomenon, or scientific problem that can be tested by further investigation.

   Kid-friendly definition: How you think something might work or what you think might happen.

ii. **Observation** – The act of noticing or perceiving something. In science, observations refer to noting or recording a fact or occurrence.

   Kid-friendly definition: What you see or feel happen.

B. Distinguishing types of science

i. **Physics** – the science of matter, energy, movement and force.


   2. Example: use when kids are pushing or pulling a toy, kicking ball, playing toss, etc. “Why did that ball move? What made it move? The force of you throwing it.” “Why did the ball hit the ground if you threw it up in the air? Gravity brought it back down.”
ii. **Biology** – The science of life and of living organisms, including their structure, function, growth, origin, evolution, and distribution.


2. Example: use when discussing anything related to themselves (such as their senses or their heart beat or breathing) or when talking about other living things (bugs on the playground, trees in the fall etc.)

iii. **Geology/Earth Science** - The scientific study of the origin, history, and structure of the earth.

1. Kid definition: study of non-living natural things (rivers, mountains, rocks, sand, lakes, planets, tides, etc.)

2. Example: use during circle time when discussing the weather or when looking at rocks on the playground, or asking if anyone felt the recent earthquake or lost power in the recent hurricane.

iv. **Chemistry** - The scientific study of the structure, properties, and reactions of the chemical elements and the compounds they form.

1. Kid definition: mixing, heating or cooling of things to make new things (ex: mix eggs, butter, milk & flour together to make batter. These things are forever changed now. When you heat the batter, it forever changes again into pancakes.)

2. Example: use when painting (mixing colors), doing crafts or during snack time if someone brought chocolate milk or a cooked food.

v. The field of Science is huge with a wide range of careers that stem from it. One way to introduce this idea to kids is to have a “Scientist of the Week” spot in your classroom and highlight a different type of science career every week. The kids might be surprised how many scientists they encounter regularly in their lives (zoo worker, doctor, astronaut, fisheries scientist, laboratory scientist, etc.).

III. **INSERTING SCIENCE INTO THE CURRENT SCHEDULE**

A. **Circle-time**

i. **Data collection and charting graphs** – make data collection part of the everyday routine and graph the results. Some ideas for graphing:

1. **Individual** – each child has a handout and makes his/her own graph. See attached example of a weather chart.

2. **Collective** - a group effort where each child contributes a data point. This might be done on a poster board, Velcro board, magnet board or dry erase board. Data points can be done with stickers, coloring, magnets or Velcro points. You could also make photos of each child into a magnet or Velcro point so that each child can see where their own data point is on the bar graph. Lots of ways to be creative with a graph.
3. **Daily chart** – these are one time data charts that you don’t repeat. Examples: chart the colors of the kids shirt/sweater, or type of shoe (sneaker, dress, sandal), kid’s hair color, eye color, what their favorite food was on Thanksgiving, what they ate for breakfast etc. You can even chart toy types in the classroom or block shapes/colors.

4. **Monthly chart** – add a daily data point to the chart over the course of a month (or longer) and then look at your results at the end. Examples: chart the weather or the attendance. (Weather chart example is attached).

   ii. **Term usage**: “Does anyone know what this month’s theme is? What is your hypothesis? What makes you think that? What observations have you made in the classroom that are giving you hints to our theme?”

B. **Play-time**

   i. **Science based toys and puzzles**. A list of resources and ideas is attached.

   ii. **Science table** - have a science table that is available during regular playtime and changing the objects on the table weekly (or adding to it weekly for a monthly theme). At the end of the week, discuss the objects as part of your lesson (now that the kids have had plenty of time to observe, explore and process what they’ve seen). Peggy Ashbrook’s *Science is Simple* has 250 activities that start with a science table. Some examples:

   1. *Exploring trees* – put a variety of parts of a tree on the table, such as bark, slice of a small trunk, leaves, twigs.

   2. *Measuring* – put out a variety of tools used for measuring: retractable measuring tape, ruler, seamstress tape, etc.

   3. *Rocks* – put a variety of different rock types out on the table.

   4. *Magnets* – put a variety of magnets on the table and a variety of objects. Let the kids explore which objects the magnets attract.

   5. *For any project* – simply by putting out the tools you’ll use on a different day to allow them to fully explore ahead of time gives the kids time to process before the project begins. If you are planting a plant…having the empty pot, flower bulb, trowel, and bag of dirt available for a few days ahead of time lets them touch and feel and explore on their own terms before the project begins.

C. **Story-time** - incorporate science topics into their daily shared reading choices.

   i. **Books** - Gail Gibbons writes great books that are on science themes that kids enjoy listening to and a lot of fiction stories have some elements that can be connected to science. A list of suggested books is attached.

   ii. **Magazines** – there are now a variety of science magazines available for kids. A subscription to one of these would add an ever-changing variety to the book corner in the classroom. A list of magazine ideas is attached.
iii. **Term Usage**: “The name of this book is ______. Look at the cover picture. What is your hypothesis? What do you think this book is about? What do you think might happen? Why do you think that? Let’s read and find out if your hypothesis is correct.”

D. **Art**

i. **Introducing Journals** – scientists are also writers and illustrators. Journal keeping, note taking, data collection are all an important part of science. For preschoolers, journals can simply be drawing their observations or reflecting on something they learned.

ii. **Power of observation** – encouraging kids to draw what they see instead of what they know. For example – if you ask kids what color grass is, they will all say green. However, when you really look at grass, you see different shades of green and yellow and brown. Have kids draw a leaf. Then give them a leaf and have them draw another one paying attention to detail.

E. **Recess**

i. **Science in Action** – Great time to talk about nature (look at the leaves, trees, plants, etc.) or sort rocks (how many different types of rocks are out here?) or discuss physics (with ball play or playground equipment).

ii. **Term Usage** “Let’s look out the window. What is your hypothesis? Is it cold or warm out? Does it look like it might rain soon? Why do you think so? Is it windy? Sunny?” Once outside, “What is your observation? Was your hypothesis correct?”

IV. **SCIENCE LESSONS** – having a weekly, bimonthly or monthly science time in which you explore a science topic is a great way to introduce kids to science topics.

A. Determining if objects sink or float, erupting a volcano, making bubbles by mixing acids and bases are just a few of the lessons you can do in a short class. Don’t forget to chart your results!

B. There are several books for sale on Amazon.com that detail science experiments for preschoolers. See our list of books we recommend attached.

V. **LONG-TERM PROJECTS** - many science projects can’t be completed in a short lesson.

A. **Class pet** – having an animal to observe and care for in the classroom is a wonderful way to bring science into the preschool day (Biology!). Bunnies, hamsters, turtles, lizards are popular preschool pets, but it doesn’t have to be a pet store pet. An ant farm, worms, or pill bugs can be kept and observed in the classroom as well.

B. **Long term observations** - growing plants, butterfly metamorphosis and frog metamorphosis are some examples of projects that are done over the long-term. However, even simple projects are fun and educational.

   i. put a piece of black construction paper on the window sill with an object on top and watch the paper fade over time, leaving a darkened shape from your where you object protected it from the sun.

   ii. Put a large white flower in a vase of water. Add a dramatic color to the water, like blue or red. Over time, observe how the flower changes color when it absorbs the coloring.
iii. See the preschool science project book list at the end of this page for endless project ideas.

VI. CONCLUSIONS

A. In general we want to encourage students to be more observant, to question the world around them, to try and figure things out themselves, and to not be afraid to venture a guess. We want them to have a least a vague idea of what it means to be a scientist and that they can be scientists when they grow up.

B. Don’t be afraid to say you don’t know the answer. Encourage questioning by telling them it is a good question and you’ll find out the answer for the next class. These are learning opportunities for both student and teacher!
PRESCHOOL SCIENCE PROJECT BOOKS/RESOURCES


Natural Start Alliance:  [http://naturalstart.org/](http://naturalstart.org/)  a coalition of educators, parents, organizations, and others who want to help young children connect with nature and care for the environment.


For ideas on fun and easy science experiments and projects, visit [http://thescienceseed.com/explore](http://thescienceseed.com/explore) and click on the ‘Science at Home’ tab.

SCIENCE TOY RESOURCES

Lakeshore Learning  [http://www.lakeshorelearning.com/](http://www.lakeshorelearning.com/) Click on “Science” or “STEM” under *Products* and then narrow by age group. Lakeshore has a physical location near Springfield that I highly recommend visiting: 7009A Manchester Blvd. Alexandria, VA 22310.

Discovery Toys [http://www.discoverytoys.com/](http://www.discoverytoys.com/) Click on “Catalog” and “USA” to view their full catalog.

Fat Brain Toys [http://www.fatbraintoys.com/](http://www.fatbraintoys.com/) (Under *Toy Categories*, click on “Science and Nature” Or “STEM toys” and then click on “3-4 years” under *Ages*.

Beleduc Puzzles (aka Hape) - available on Amazon.com and other stores and websites.

  Development layer puzzle - Egg to Duck, seed to apple, seed to strawberry, egg to frog, caterpillar to butterfly, egg to baby inside mother’s uterus, baby to grandparent.

  Body Systems layer puzzle – boy, girl, fish, cat

  Other – seasons, animal and child shadow play puzzle and more…

SCIENCE EQUIPMENT AND SUPPLIES

Oriental Trading  [http://www.orientaltrading.com/](http://www.orientaltrading.com/) Click on “Teaching Supplies” and then “Science” under *Curriculum Projects and Activities*.

Lakeshore Learning  [http://www.lakeshorelearning.com/](http://www.lakeshorelearning.com/) Click on “Science” or “STEM” under *Products* and then narrow by age group. Lakeshore has a physical location near Springfield that I highly recommend visiting: 7009A Manchester Blvd.

Alexandria, VA 22310.
Educational Innovations  [http://www.teachersource.com/]  This site tends to have higher level science equipment, but is a good resource for bulk supplies for projects.

Carolina Biological  [http://www.carolina.com/]  For buying your tadpoles or caterpillars, etc.

InsectLore  [http://www.insectlore.com/]  They sell several kits for watching life cycles and can sell refills, however probably more expensive than Carolina Biological.

Delta Education  [https://www.deltaeducation.com/]  They sell a variety of preK science kits.

Arbor Scientific  [http://www.arborsci.com/]  Mostly equipment for older students, but a good resource for buying in bulk certain items.

**SCIENCE MAGAZINES FOR KIDS**

Ladybug or Click  [http://shop.cricketmedia.com/]  Click on “Magazines by Age”.

National Geographic Kids and National Geographic Little Kids  [https://kids.nationalgeographic.com/]

Zoobooks and Zootles  [http://shop.zoobooks.com/]


**SCIENCE BOOKS FOR KIDS**

**NON-FICTION, by author**

Gail Gibbons
- Apples
- Frogs
- From Seed to Plant
- Ice Cream
- Monarch Butterfly
- Pumpkins
- The Planets
- The Reasons for Seasons
- The Vegetables We Eat
- Sun Up, Sun Down
- The Seasons of Arnold’s Apple Tree
- Nature’s Green Umbrella: Tropical Rain Forests
- Planet Earth / Inside Out
- The Honey Makers
- Exploring the Deep Dark Sea
- Recycle! A Handbook for Kids
- Milk Makers
- Weather Forecasting
- The Moon Book
- Tornados
- Weather Words
- How a House is Built
- Hurricanes
- And many many more…

Aliki
- My Five Senses
- Milk: From Cow to Carton
- Fossils Tell of Long Ago
- Digging Up Dinosaurs
- My Hands
- I’m Growing
- My Feet
- Dinosaur Bones
- Corn is Maize

**NON-FICTION, by series**

*Let’s Read and Find Out Science* (these books are leveled, Level 1 is most appropriate for pre-school):
- What’s Alive?
- Clouds
- Air is All Around You
- How a Seed Grows
- How Many Teeth
- A Nest Full of Eggs
- Snow is Falling
What’s it Like to be a Fish
• From Tadpole to Frog
• From Seed to Pumpkin
• Sounds All Around
• Animals in Winter
• From Caterpillar to Butterfly
• Bugs are Insects
• Simple Machines
• What is the world made of?
• The Sun
• Flash, Crash, Rumble & Roll
• Light, it is all around us
• What makes day & night
• Sunshine makes the seasons
• What happens to our trash?
• And many many more....

The Cat in the Hat Knows A Lot About That
• A Whale of a Tale!
• Clam-I-Am!
• Fine Feathered Friends
• I can Name 50 Trees Today!
• Ice is Nice!
• If I Ran the Rain Forest
• I Love the Nightlife!
• Is a Camel a Mammal?
• Lots of Flocks
• Miles and Miles of Reptiles
• Oh, Say Can You Say Di-no-saur?
• Oh Say Can You Say What’s the Weather Today?
• Oh Say Can You Seed?
• On Beyond Bugs
• Show Me the Honey
• There’s No Place Like Space
• Wings and Paws and Fins and Claws
• Wish for a Fish
• Would you Rather Be a Pollywog?
• And many many more....

FICTION, by author
Eric Carle
• The Very Hungry Catepillar
• A Home for Hermit Crab
• The Mixed Up Chameleon
• Mister Sea Horse
• The Very Lonely Firefly
• The Tiny Seed

Denise Flemming
• Bear Snores On
• In the Tall Tall Grass
• In the Small Small Pond
• Time to Sleep
• Lunch
• underGROUND
• Where once there was a wood
• And more...

Lois Ehlert
• Waiting for Wings
• Red Leaf, Yellow Leaf
• Eating the Alphabet
• Growing Vegetable Soup
• Planting a Rainbow
• Leaf Man
• Nuts to You
• Oodles of Animals
• And more...

Leo Lionni
• Fish is Fish
• A Color of my Own
• Swimmy
• It’s Mine
• An Extraordinary Egg
• Inch by Inch
• The Biggest House in the World
• And more...

Andrea Beaty
• Iggy Peck, Architect
• Rosie Revere, Engineer
• Ada Twist, Scientist

Chris Van Dusen
• If I Built a Car
• If I Built a House
• And more...
General:
Measurement

Biology & Nature:
Animal Classification (Reptile, Amphibian, Bird & Mammal)
Human Body
Explore the Seashore
Leaves
Senses
Homes & Habitats
Life Cycles
Magnification, Eyes & Lenses
Germs
Skin

Geology/Earth Science:
Fossils
Volcanoes
Rock Cycle
Recycling
Shadows/Day & Night
Water Cycle
Solar System

Physics:
Gravity
Magnets
Balance
Sink or Float
Simple Machines
Light
Flight

Chemistry:
Mixing & Diffusing
Dissolving
Liquid, Solid, Gas
Acids & Bases (Chemical Reactions)
Energy

Nutrition:
Traffic Light Foods/Eat a Rainbow
Farming a Pizza
# Weather Chart

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