Simply Science

FOR PRE-SCHOOLERS

Leaf graphic courtesy of www.dragonartz.net

WAYNE RESA
Leading... Learning for All

National Head Start Program

Robert A. Ficano
County Executive

Wayne County Health and Family Services Head Start and three of its delegates, Starfish Family Services Head Start, The Guidance Center Head Start, and Wayne Westland Head Start, collaborated with Wayne RESA and the HighScope Educational Research Foundation to produce Simply Science.

Simply Science is a parent education resource and tool to inspire parents to interact with their young children and support early science learning in playful ways using:

- a supportive home environment
- home – early education and care connections
- interactive parent – child strategies
- community resources
- internet resources

Wayne County Head Start extends its appreciation to Wayne RESA for making this early science education resource available to parents of preschool-age children.

National Head Start Program

THE GUIDANCE CENTER

HIGH/SCOPE Educational Research Foundation

STARFISH FAMILY SERVICES

WAYNE RESA Leading... Learning for All

Wayne-Westland COMMUNITY SCHOOLS

Introduction

Young children are natural explorers of their environment. As young children explore their environment, they begin to notice relationships that are the foundations for science. Their curiosity pulls them into experiences with the natural world and makes them explore how things work.

Preschool-age children become interested in what the HighScope Educational Research Foundation has identified as the Six Components of the Preschool Scientific Method—**observing**, **classifying**, **experimenting**, **predicting**, **drawing conclusions**, and **communicating ideas**.[1] It's through those experiences that young children build a foundation for science learning.

When parents encourage their children to ask questions and help children explore and discover the natural world, they are helping to build an interest in science. Many experts say that children who have such experiences when they are very young learn to enjoy science and feel confident they can learn it. This confidence can pay off as children get older.

Play is important to young children's development and education. So, it isn't surprising that children experience science first through play. Play is a vehicle that allows a child to access and explore his or her world. Through play children pursue their own goals. They tackle problems that challenge just enough to keep them interested, without causing too much frustration.

Simple science activities engage children in observing, classifying, experimenting, problem-solving, predicting, and analyzing situations. Children will use all these skills—in school, on the job, and in everyday life. Parents can help build this foundation for learning. And since science becomes increasingly important in a technology rich world, it is even more important for our children to experience and learn science at home, as well as in school.

[1] From *Real Science in Preschool* (p.10) by Polly Neill, Ypsilanti, MI: HighScope Press.

Section 1: Creating a Science-Friendly Home

Your child can find many places in and around your home to learn and use the preschool scientific method.

Each area of the home offers materials for your child to observe and use. By using the five senses with many different kinds of things, your child can classify, experiment, predict, make conclusions, and communicate ideas.

The outdoor environment and the natural world offer a variety of materials and experiences that your child can explore. With you or family members, your child can freely explore the outdoors—from neighborhood parks to wooded areas to local beaches.

But remember—young scientists need to touch, poke, prod and explore in order to get the most from the preschool scientific method. Give your child the space to make choices about what to explore or how to interact with things in his world.

IN THE KITCHEN

- Explore eggs with your child. Allow your child to use his senses to explore and observe a raw and a cooked egg. Ask your child to describe and explain the changes that happen to the egg during the cooking (boiling or frying) process.

- Observe vegetable oil and vinegar poured into two separate containers. Then mix them together. Ask your child if any change occurred. And if so, ask why it happened.

- As you begin a family meal, remove an ice cubes from the freezer. Watch what happens to it when it is left on the kitchen table. Place a second ice cube in the refrigerator at the same time. Ask your child to observe each ice cube once the meal is finished. Do the ice cubes look the same? Different? Comment to your child, "I wonder why one ice cube is so small."

- Create a volcano out of play dough. Insert a small container in the top of the volcano. Pour some baking soda into the container. When you are ready for the volcano to erupt, allow your child to pour vinegar into the baking soda. Ask your child, "I wonder why that happened?" Then listen to their ideas!

- Give your child a straw and collect different small objects, such as a feather, button, cotton ball, seeds, etc. Ask what items will be the easiest to move by blowing through the straw. Ask for an explanation of the prediction. Then let your child experiment by blowing each item across a table with the straw. Talk about which items were easiest to move. How accurate was the prediction?

- Make Jell-O® with your child. Give extra items such as raisins, marshmallows, and banana slices to add to the Jell-O®. Notice together which of these items sink and which ones float. Draw a simple graph or chart with columns labeled "float" and "sink" to record your child's findings.

- Prepare a simple recipe together. Ask your child to predict how the mixture will change as you add each ingredient. Have your child draw a picture of the mixture before and after it was prepared.

- Explore the changes and textures that occur when you slowly mix one part water to two parts cornstarch. Encourage your child to experiment and predict what might happen if more water or cornstarch is added to the mixture.

IN THE LIVING ROOM

- If you have leafy plants in your home, let your child help give them water and sunlight. Observe what happens over time as you turn the pot to expose different sides to the sun. Ask your child to predict what will happen if you turn it again.

- Put a familiar item into a paper bag. Have your child put her hand in the bag to feel the item. (No peeking!) Ask her to describe what she feels and to guess what it could be. Repeat the with several different items, either one at a time or several at once.

- Collect pictures of a variety of objects, (animals, cars, food, plants, blocks, or anything that interests your child). Have your child help you sort them into groups of things that are alive and things that are not alive. Encourage your child to classify by making a two-column "alive" and "not alive" graph or chart on which he can place the pictures.

- Ask your child to take a few moments and listen very carefully to the surrounding sounds. Ask if the sounds were made by people, machines, animals, etc.

- When the television or CD player is turned on, invite your child to explore how sound moves by listening to from different rooms of the house or through closed doors. Encourage your child to predict if the sound will get louder when a door is opened or closed. Why is the sound loud in the room with the television and less loud as you move from room to room?

- Gather materials that your child can set in motion. For example, things with wheels (toy vehicles); things that roll (balls, beads); and things that spin (lids, tops). Explore and experiment with these materials with your child to learn about direction and distance.

IN THE BEDROOM

- Explore together the materials used to make the pillows, sheets, and blankets. Look at the fibers, feel the textures and weight, and listen to sounds they make as they are touched and moved.

- Talk about how shoes are made to stay on feet. Some shoes have laces, some have Velcro®, and some have elastic. Ask your child to sort or classify shoes and boots in this way or other ways.

- Give your child a flashlight to shine onto a mirror and see where the light beam bounces. Use the flashlight to project shadows on the wall. How are shadows made? Listen for your child's ideas and conclusions about shadow making.

- Compare the colors of your child's favorite toys when they are in the light and when they are in the dark. (At night, turn the lights on and off. During the day, climb under a blanket to find a dark place.) Can you see the colors in the dark? Talk about your child's observations and ideas.

> "Doing science is solving problems and answering questions."
>
> David Bydlowski, Science Consultant Wayne RESA

IN THE BATHROOM

- Allow your child to explore what happens when things like soap or towels get wet. Discuss any changes your child observes between dry and wet conditions.

- After your child dries off from a bath, hang up the towel and check its wetness/dryness over time. Do some areas of the towel remain wet while other areas of the towel dry sooner? Why? Listen for your child's conclusions.

- Observe a bathroom mirror right after someone has used the shower. Can your child see in the mirror? Is the mirror wet? Are there spots on the mirror?

- At bath time, allow your child to take a variety of small playthings into the bathtub and predict whether each item will float or sink. Experiment and test the predictions.

- Give your child a mirror, and allow her to watch herself brush her teeth. Talk about how bubbles begin to form from the toothpaste. Which kind of brushing makes more bubbles: fast or slow?

IN THE YARD

- Observe grasses and plants in the yard.

- During the fall, observe how some trees change colors and some do not.

- Place a piece of scrap wood on bare dirt. Come back in two days, lift the board, and discover the insects and tiny animals that have found shelter under it. Why are they there? Listen for your child's ideas and conclusions.

- Explore puddles of water that collect outdoors after a heavy rain.

- Ask your child to gather samples of things he finds in the yard. Then sort or classify them into groups by size, shape, color or other trait.

- Watch how the sun shines on different areas of the yard or house at different times of the day.

- Observe tracks left by animals, humans, or vehicles. Compare the sizes, patterns and types.

- Prepare a garden space outdoors or a pot indoors for your child to plant flowers or vegetables. Have your child choose a packet of seeds and plant a few according to the directions. Water the garden and discuss the changes you see daily.

- Buy play sand from your local garden or hardware store. Pour it out and allow your child to add water to make mud. Encourage molding the sand. Discuss the changes and consistency of her mixtures.

- Keep a simple weather journal with your child this week. Encourage your child to illustrate sunny or rainy days with simple drawings of a sun, clouds, or raindrops.

IN THE NEIGHBORHOOD

- Have your child find leaves, seeds, or flowers on the ground and try to predict what tree it came from.

- Go for a "bird walk" with your child. Look for different birds and listen for the sounds they make. Imitate the different sounds that you hear.

- Visit a local construction or demolition site. With your child, watch and talk about the vehicles and machines used to dig, transport, lift, etc.

- Visit a local park and look for evidence of the animals that live there—observe ponds, holes in the ground, nests in the trees, cracked acorns and nuts, etc.

Section 2: Building Good Home-Early Education/ Care Connections

As a parent, you are the "expert" on your child. You are the resource early childhood staff needs to provide effective services for your child and family. Your involvement in your child's preschool education or child care program supports your child's success in school and learning.

All early childhood education and child care programs benefit from parents being involved. Parent involvement includes:

- Welcoming teaching and family service staff into your home, if the program offers home visits
- Attending parent–teacher conferences or open houses
- Sharing information about your child's life and home experience with program staff
- Sharing materials and resources that allow your family culture or home language to be part of the classroom or child care site
- Keeping program staff informed about changes in your child's and family's life and home experiences through phone calls, notes, and on-site visits with the staff
- Attending family activities at your child's preschool or child care site
- Attending and participating in parent meetings and parent committees or program governing groups
- Volunteering in your child's preschool classroom or child care site

"If a child is to keep alive his (her) inborn sense of wonder, he (she) needs the companionship of at least one adult who can share it…"

Rachel Carson (1907 – 1964), Writer and Environmentalist

Section 3: Learning and Doing Science Together

Parents can support and nurture their child's curiosity, exploration and learning about their world. You can build a foundation for future science learning when you learn and explore together. While you do, keep several things in mind:

- Your child may need you to offer comfort and contact to explore and investigate their surroundings. Your child may need a reassuring touch or a simple nod that shows you are interested in a sense of wonder about the world. Acknowledge your child's fears and provide reassurance him, if things in the natural world are unfamiliar or frightening.
- Join your child at their level; get on your knees or lay in the grass with your child.
- Explore and experiment along with your child. Use materials in the same way your child does.
- Listen to your child. This can be as important as talking to them. Be an active listener.
- Accept your child's ideas.
- Young children need to talk with adults about their experiences, in order to understand the world and do science through use of the preschool scientific method.
- Comment on your child's ideas and investigations. Be specific and describe your child's thinking and actions.

TALK ABOUT SCIENCE

Urge your child to discuss science experiences with you. You can support the "back and forth" sharing of ideas in a conversation by asking a few open-ended questions that encourage your child to talk more.

Open-ended questions require more of an answer than a simple "yes" or "no" or a one-word response. Open-ended questions invite your child to answer with more words and thought. In this way, open-ended questions support the development of higher levels of thinking.

EXAMPLES OF OPEN-ENDED QUESTIONS

Use a comment or an open-ended question to suggest a new idea that is directly related to your child's experience. A new idea can challenge your child's thinking and lead to further experimentation and prediction.

- I wonder what will happen if…?
- What will it look like if…?

Encourage your child to describe what is being observed, created, and used.

- What are you doing now?
- What is happening?

Ask a few questions that are related directly to what your child is doing or sensing.

- Why do you think…?
- How did you…?
- Why are you…?
- Can you find another way to…?

PRACTICE DOING SCIENCE

Encourage your child to solve his own questions and problems with materials being used or explored. Accept her answers and solutions to problems.

Encourage your child to use drawing or writing materials to record observations, experiments, predictions, and conclusions. Accept your child's drawing and writing efforts, and don't push for perfection.

Occasionally, you can record with drawings and words the ideas and observations that your child shares with you.

Make a simple, two-column graph or chart that encourages your child to classify materials by traits such as "bumpy" or "smooth" by placing small items within each of the labeled columns. If you are classifying larger items, use drawings or words in each column.

Through drawing and writing, create a journal with your child that keeps a record of her science experiences and discoveries.

Section 4: Community Resources

Ann Arbor Hands-On Museum
220 E. Ann St.
Ann Arbor, MI 48105
(734) 995 – KIDZ (5439)
www.aahom.org

Children's Museum
6134 Second Ave.
Detroit, MI 48202
(313) 873 – 8100
www.detroitchildrensmuseum.org

Cranbrook Institute of Science
39221 Woodward Ave.
Bloomfield Hills, MI 48303
(877) 462 – 7262
http://science.cranbrook.edu

Detroit Science Center
5020 John R St.
Detroit, MI 48202
(313) 577 – 8400
www.detroitsciencecenter.org

Detroit Zoo
8450 W. 10 Mile Rd.
Royal Oak, MI 48067
(248) 398 – 0900
www.detroitzoo.org

Exhibit Museum of Natural History
University of Michigan
1109 Geddes Rd.
Ann Arbor, MI 48109
(734) 764 – 0478
www.lsa.umich.edu/ExhibitMuseum

Ford Motor Factory Tours
Departs from the Henry Ford
20900 Oakwood Blvd.
Dearborn, MI 48124
(313) 271-1621
www.thehenryford.org

Heritage Park Petting Farm
12803 Pardee Rd.
Taylor, MI 48180
(734) 374 – 5946
www.cityoftaylor.com/pettingfarm

Saint Joseph Mercy Health Exploration Station
Saint Joseph Mercy Canton Health Center
1600 S. Canton Center Rd., Suite 10
Canton, MI 48188
(734) 398 – 7518
www.healthexplorationstation.com

Section 5: Internet Resources

- **Biokids** is the website of a research group working to improve science education in urban schools. The site offers links to depictions of children exploring insect and animal life.
www.biokids.umich/edu

- **Bubblesphere** is a website devoted to creating and playing with bubbles. Online photos, games, and links to other "bubblemania" sites are featured.
http://bubbles.org

- **Children and Nature Network** is devoted to reconnecting children and nature. The website provides links to news items, research, and video presentations addressing children's use of open spaces, nature, and recreational physical activity.
www.childrenandnature.org

- **Early Childhood News** offers parents and early childhood teachers learning experiences to share with children from infants to 8 years of age. Ideas for indoor and outdoor activities are provided.
www.earlychildhoodnews.com

- **HighScope Educational Research Foundation** offers links to information and videos about the "active participatory learning" approach to early science education.
www.highscope.org

- **MyPyramid for Preschoolers** is a website that focuses on healthy eating, but includes activity ideas that support children's skills of observation, classification, and prediction.
http://mypyramid.gov/preschoolers/index.html

- **The National Wildlife Federation** website includes a link for Kids & Families where parents can sign up for a free monthly e-newsletter with activity ideas for exploration of nature and animal life.
www.nwf.org/kids/

- **Nature Rocks** is a website that describes a variety of activities for young children's exploration of nature, links to videos, and a locator to identify unique nature sites close to home.
www.naturerocks.org

- **PBS Kids' Jay Jay the Jet Plane** offers activities that support children's understanding of science in their everyday world. Common and easily accessible materials are identified for children's scientific investigations.
http://pbskids.org/jayjay/care.sciencenature.html

- **PBS Kids' Sid the Science Kid** is an interactive website that engages children and gives parents ideas for home activities.
www.pbskids.org/sid

- **PBS Kids' ZOOM** offers activity ideas for preschool-age children that encourage exploration and use of the preschool scientific method.
http://pbskids.org/zoom/activities/preschool/

- **Sesame Workshop's One World, One Sky** is a multilingual website that introduces children to the wonders of the night sky with the familiar characters of Sesame Street.
www.sesameworkshop.org/initiatives/respect/sky

- **Wayne County Parks** provides information about the interactive, hands-on family activities offered in the parks of Wayne County.
www.waynecountyparks.com

- **Wayne RESA Early Childhood Services for Parents** provides online links to a variety of free resources for early childhood activity ideas.
www.resa.net/earlychildhood/forparents/

- **X-rays for Kids** offers children a view of x-ray photographs of plants, insects, shells, and other "neat things".
www.uhrad.com/kids.htm

31 Days of Activities to Nurture a Young Scientist*

1	2	3	4	5	6	7
Encourage your child to imitate the sounds of animals or insects heard in the yard.	Make muffins with your child and let him choose the kind to make.	Make a "Feel Book" with your child. Glue different fabrics to each page. Talk about textures.	Look outdoors. Talk about the season.	Explore things your hands can do—clap, bend, snap, etc.	Watch what happens after painting the sidewalk with water.	Ask your child how she knows if it is day or night.
8	**9**	**10**	**11**	**12**	**13**	**14**
Wash old pennies in vinegar and salt. What happens?	Use paper and crayons to make tree rubbings.	Stretch rubber bands around a small box and pluck them to make sounds.	Outside, find and talk about animals that live in trees.	Watch the movement of clouds.	Outside, find three things that smell good or smell bad.	Watch small things roll down an angled paper towel tube.
15	**16**	**17**	**18**	**19**	**20**	**21**
What happens to dark paper if it is placed in a sunny area all day long?	Breathe onto a window or mirror. What begins to happen?	What happens when a little vinegar is placed on baking soda?	Mix cooking oil and colored water in a clear plastic bottle.	On colored paper, draw with a candle, then wet the paper.	Place leaves under paper and make leaf rubbings.	Play with ice in the sink. What happens over time?
22	**23**	**24**	**25**	**26**	**27**	**28**
Outdoors, find things that can fly in the air.	Encourage your child to make sounds by blowing across the top of a plastic bottle.	Lay in the grass and look for insects.	Pull a weed from a crack in the sidewalk and explore its root.	Use a handheld eggbeater with liquid soap and water.	At night, in a lamp lit room explore shadows on the wall.	Talk into a jar, bottle, and can. How does the sound change?
29	**30**	**31**				
On a warm day, place some rocks in the sun and others in the shade. Later, compare how each set of rocks feel.	Encourage your child to feel his throat as he swallows. Ask him to describe what is happening.	In the night sky, find the moon.				

*Some of the calendar activities are from the Leaps and Bounds Child/Parent Activity Kit of the Poverty and Social Reform Institute
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