

Science



SAIGES Perspective:

SAIGE likes to paint rainbows. She says all the colors in the rainbow by singing the color song, "Red is rojo, green is verde, ..."

Standards Consultant's Perspective:

SAIGEs experience illustrates the integration of many different standards domains: Science (weather, color formation), The Arts (singing, painting), Language & Literacy (including learning words and concepts in English and Spanish), and Physical Development (use of fine motor skills to draw).

This artwork was created by Saige Lopez, age 3. Saige was a student in the Sunnyside Head Start class in Tucson. This program is operated through Child Parent Centers, Inc.

SCIENCE

Rationale Statement:

Children are immersed in science in their daily lives. Their natural curiosity and sense of wonder lead them to observe, question, investigate, and interpret the infinite possibilities of the world around them. In this process of searching for meaning and developing understanding, children build a foundation for life-long learning. As they come to see, appreciate, and respect the interconnectedness of the universe, children are inspired to become responsible citizens of the Earth.

CORRELATION TO K-12 SCIENCE

The Arizona Early Childhood Standards (ECE) are intended to provide a solid, coherent foundation of knowledge and skills to prepare children for kindergarten and the primary grades. As such, the skills and knowledge in the ECE standards were designed to correlate with the new grade specific drafts of Reading and Mathematics standards and the remaining Arizona Academic Readiness and Foundation Standards. The K-12 standard and related Performance Objective(s) that correlates can be found next to each ECE indicator in the following pages.

Samples:

Citation of New Grade Specific K-12 Draft Standards:

1 M 3-2 PO1 = 1 (GRADE) M (MATHEMATICS) 3-2 (STRAND-CONCEPT) PO1

Citation of Original Version of K-12 Standards

R SC 2-1 PO3 = R (READINESS LEVEL) SCIENCE (SCIENCE STANDARDS) 2-1 (STRAND-CONCEPT) PO3
F SS 1-1 PO 2 = F (Foundations Level) SS (Social Studies) 1-1 (Strand-Concept) PO2

Key to AZ K-12 Standards Correlated to Science ECE Standards:

M (Mathematics)
PA (Physical Activity)
SC (Science)
SS (Social Studies)

Context Statement for Science

Young children are eager to discover all they can about the world in which they live. Children need opportunities for interactive explorations, observations, and systematic investigations that develop from their curiosity about the natural and physical worlds. Through these scientific experiences, children develop creative and cognitive thinking skills that make learning meaningful. Building on meaningful experiences, children develop a perception of themselves as explorers. As competent learners, children cycle through the process of developing and refining theories and begin their quest for understanding.

STANDARD 1.

Children use the process of scientific investigation (inquiry) to develop an understanding of living things, the earth, and the environment.

Benchmark 1.1

The child observes the surrounding world; exhibits curiosity, interest, and wonder during explorations; begins to hypothesize, predict, and test theories in investigations; reflects on experiences; and applies developed learning to new situations.

Developmental Continuum

Examples That You May Observe

Developmental Continuum			Examples That You May Observe	
P H A S E 3	P H A S E 2	P H A S E 1	Phase 1: Exploration	
			a. Perceives self as an explorer. <i>(R SC 2-1 PO1)</i>	Child says, "I'm digging for dinosaur bones."
			b. Uses senses to observe and explore animals, plants, and other natural phenomena. <i>(R SC 1-6 PO1, PO2)</i>	Child identifies the different pitches of sounds when bottles are filled with different levels of water. Child explores various properties of light, including shadows, moonlight, sunlight, reflections, rainbows, prisms, solar prints, and tinted lenses.
			c. Displays curiosity and wonder about animals, plants, and other natural phenomena. <i>(R SC 1-2 PO1; R SC 1-4 PO1)</i>	Child says, "Look at the beautiful butterfly on the flower." Child expresses delight about the sparkle in the rocks she picked up on the playground.

Developmental Continuum			Examples That You May Observe	
P H A S E 3	P H A S E 2	P H A S E 1	<p>Phase 1 cont.</p> <p>d. Responds to questions about objects, events, and their relationships to further own understanding about the natural and physical worlds. <i>(R SC 1-2 PO1; KM 2-1 PO1)</i></p> <p>e. Gathers information about objects and organisms using a variety of tools and materials. <i>(R SC 1-5 PO2; R SC 3-2 PO1)</i></p>	<p>Child responds to questions such as “What if . . .?” and “Where else have you seen this?”</p> <p>Child uses a magnifying glass during outdoor time to examine the grass.</p> <p>Child explores materials using scale, microscopes, tweezers, tongs, spoon, spatula, colander, rolling pin, and jeweler’s loupes to explore a variety of materials.</p>
			<p>f. Engages in conversations about animals, plants, and other natural phenomena. <i>(R SC 1-2 PO1)</i></p>	<p>During the reading of <i>The Hungry Caterpillar</i>, child says, “I saw a caterpillar in my yard. Can I bring it to school tomorrow?”</p> <p>During circle time, the class talks about the recent rain storm.</p>
			<p>g. Demonstrates a willingness to take risks by choosing to participate in a variety of experiences. <i>(R SC 2-1 PO1; F SC 1-1)</i></p>	<p>Child is willing to put own hands in the soil to plant seeds.</p> <p>Child says, “Let’s make the car go faster,” as she tilts the ramp higher.</p>
			<p>Phase 2: Investigation</p> <p>h. Poses questions about animals, plants, other phenomena, and their relationships to further own understanding about the natural and physical worlds. <i>(R SC 1-2 PO1; KM 2-1 PO1)</i></p>	<p>Child asks, “What is the nest made of? How did a bird do this without hands?”</p> <p>During circle time, child talks about his investigation with magnets. Another child asks, “Does the magnet work under water?” Other questions include who, where, why, and what if questions.</p>

Developmental Continuum		Examples That You May Observe	
P H A S E 3	P H A S E 2	<p>Phase 2 cont.</p> <p>i. Examines objects, organisms, and events by noticing their attributes and paying attention to detail. <i>(R SC 1-3; R SC 1-6 PO2; R SC 3-1; R SC 4-1, R SC 4-2; R SC 4-3; R SC 5-1; R SC 6-1; R SC 6-4)</i></p> <p>j. Selects and uses the appropriate tool(s) to complete a particular task or investigation. <i>(R SC 1-5 PO1)</i></p> <p>k. Predicts the outcome of investigations and test predictions through active exploration. <i>(R SC 1-4 PO2; 1 M 3-4 PO2)</i></p> <p>l. Recognizes and solves problems through trial and error.</p> <p>m. Organizes, displays, and interprets data using objects, drawings, and other graphic organizers. <i>(R SC 1-3 PO1; R SC 1-6 PO1, PO2; 1 M 2-1 PO2; K M 2-1 PO2,PO3)</i></p> <p>n. Forms generalizations about investigations.</p> <p>o. Uses safe and healthy practices and routines during explorations and investigations. <i>(R SC 1-1 PO1)</i></p>	<p>Child notices bean seeds planted in clear bags have sprouted into plants with roots, a stem, flowers/petals, and leaves.</p> <p>As a result of hearing <i>Whistle for Willie</i>, child moves in the sunlight and realizes that his own shadow moves when he moves.</p> <p>Child selects a scale to figure out how many small blocks will weigh as much as a big block.</p> <p>Child predicts that properties of substances can change when substances are mixed, cooled, or heated, e.g., child says, “I need wet sand to build a castle. I’m going to get some water.”</p> <p>Child pours water into a container to make it sink.</p> <p>Child begins a journal to record field notes and makes drawings of observations of living things seen on a walk.</p> <p>Child goes on a scavenger hunt and tallies how many plants and how many animals were seen.</p> <p>After walking around the room to find objects that will stick to the magnet, child says, “Blocks don’t stick.”</p> <p>Child wears safety goggles when breaking rocks or nuts with a hammer.</p> <p>Child uses tongs to move and examine pieces of a cactus.</p>

Developmental Continuum		Examples That You May Observe	
P H A S E 3	P H A S E 2	Phase 2 cont. p. Sorts and classifies elements of the natural and physical worlds by one or more attributes. <i>(R SC 1-3 PO1)</i>	Child sorts rock collection by size and texture.
		q. Demonstrates concepts of part and whole in the natural and physical environments. <i>(I M 1-1 P14)</i>	Child says, “These leaves fell off the tree.” Child uses felt board to play <i>What’s Missing From the Body</i> game.
		r. Uses language related to attributes of time, measurement, position, temperature, and type of materials. <i>(R SS 1-2; R SS 3-1 PO1; K M 1-2 PO6; K M 4-4 PO2)</i>	After singing “Twinkle, Twinkle Little Star,” child says, “I see the stars at night. I see the sun in the day.”
		s. Examines and represents patterns in the environment. <i>(K M 3-1 PO1)</i>	Child reaches into the “feely” box and describes the object inside as prickly and cold after touching it. Other properties used to describe objects include: weight, texture, flavor, scent, flexibility, and sound. Child draws pictures of a green and black striped pattern after observing a caterpillar with the same pattern of coloring.
		t. Observes and describes changes in objects, events, and natural phenomena. <i>(R SC 1-6 PO1, PO2)</i>	After being measured on the classroom growth chart, child describes how he is bigger now than he was at the beginning of the year. Child recognizes that matter exists in different states (ice, liquid, gas) by observing water in its different states: an ice cube, a puddle that evaporates, and steam from the soup.

Developmental Continuum		Examples That You May Observe
P H A S E 3	<p>Phase 3: Reflection and Application</p> <p>u. Plans an investigation. <i>(R CH 6-1 PO1; R CH 6-2 PO1, PO2)</i></p> <p>v. Makes predictions based on patterns of observation rather than random guessing. <i>(R SC 1-4 PO2; 1 M 3-4 PO2)</i></p> <p>w. Makes new observations when discrepancies are discovered. <i>(R SC 1-6 PO2)</i></p> <p>x. Persists with an investigation despite distractions and interruptions.</p> <p>y. Forms logical conclusions about investigations. <i>(R SC 1-6)</i></p> <p>z. Develops and represents theories and ideas about what has been observed and studied. <i>(R SC 1-4 PO1, PO2)</i></p> <p>aa. Compares and contrasts the similarities and differences in the attributes of things. <i>(R SC 5-1)</i></p>	<p>Child taps things around the room to discover what kinds of sounds they make.</p> <p>After touching the slide for a number of days in hot weather, child says, “It’s hot out. We can’t use the slide again.”</p> <p>Child looks for another metal object when the magnet won’t stick to the coins.</p> <p>Child returns day after day to study the worms in a compost pile (e.g., their movements, eating habits, how they change, and where they like to be in the soil).</p> <p>After placing different objects on a ramp, child concludes that round objects roll down the ramp and flat objects slide down the ramp.</p> <p>Child makes own version of the bird nest with clay, twigs, feathers, and other materials.</p> <p>After planting seeds and watching them grow, child creates a chant about the lifecycle of a plant.</p> <p>Looking at the rocks, child says, “These rocks are hard. This one is shiny; this one isn’t.”</p> <p>As a result of taking care of classroom animals and plants as part of the daily routine, child recognizes that animals and plants have similar needs.</p>

Developmental Continuum		Examples That You May Observe
P H A S E 3	Phase 3 cont. bb. Recognizes that there could be more than one solution to a question, activity, or problem. <i>(R SC 1-6 PO1, PO2)</i>	Child uses tape to put a book together and says to his friend, “You used staples.”
	cc. Observes and describes the relationships between objects, between organisms, and between events. <i>(R SS 1-2; 1 M 4-4 PO4, PO5, PO6)</i>	Child knows that the chick has a mom, the whale has a mom, and he has a mom. Child takes a flashlight and shines it on a mirror, color paddles, cardboard, prisms, cloth, cellophane, and wax paper, noticing a variety of lighting effects.
	dd. Describes and anticipates sequences of scientific events.	Child draws the details of a caterpillar as the caterpillar progresses through its lifecycle. Child describes how jello transforms from powder to liquid to solid.
	ee. Identifies cause and effect relationships. <i>(R SC 1-4 PO1)</i>	Child demonstrates awareness of the sequence of day and night by saying, “I sleep three more times until my birthday.” While using a pulley to hoist a bucket, child says, “It fell. I let go (of the string).”
	ff. Develops a sense of responsibility by showing appreciation for the beauty and mystery of the natural and physical worlds. <i>(A 5-1 PO3; R SS 2-1)</i>	Child digs in the soil and adds water to make the soil erode and form streams. Child answers, “The ice will melt,” in response to the question, “What will happen if we put the ice in the sun?”
		Child picks up litter on the playground. Rather than step on the spider, child decides to examine it more closely.