Ohio's Early Learning and Development Standards (Birth to age 5): Implementation Guide
Domain: Cognitive Development and General Knowledge (including Math, Science and Social Studies)

Introduction

The standards for cognition and general knowledge encompass children's knowledge of their physical and social worlds and refer to the underlying cognitive mechanisms, skills and processes that support learning and reasoning across domains, including the development of memory, symbolic thought, reasoning and problem solving. It also addresses the ability to learn about complex ideas or events through imitation. This domain also includes concepts and skills in three content areas: mathematics, social studies and science.

The strategies in this guidance document are not designed to be specific activities or "lesson plans." Rather, they represent broad approaches to implementation in each strand that may help teachers create meaningful learning activities and experiences to support development and learning.

Standard Statements	Implementation Strategies
The child will:	The teacher may:
Cognitive Skills _Memory_	
Infants Exhibit differentiated responses to familiar and unfamiliar people, events, objects and their features. Mirror simple actions and facial expressions of others previously experienced. Anticipate next steps in simple familiar routines and games	Introduce unfamiliar people in a familiar environment with familiar adults providing proximity, encouragement, security and support as needed. Stay near children, and encourage them to seek out and explore new toys or objects. Provide a variety of toys and materials to explore, noticing which are favored. Engage babies in reciprocal conversations, allowing time for baby to respond. Model new uses for familiar objects (e.g., clapping two blocks together, etc.).

	Model simple movements to music. Verbalize actions during daily routines. Read and re-read interactive books. Describe actions during daily routines as they occur (e.g., "It's time for lunch! Up we go into your highchair. I'll fasten your bib, and let's eat."). Read and reread interactive books, such as *Pat the Bunny*.
Young Toddlers Recall information over a period of time with contextual cues. Mirror and repeat something seen at an earlier time. Anticipate the beginning and ending of activities, songs and stories.	Provide a picture schedule of daily routines and refer to it as the events occur. Encourage children's repeated play with toys and materials and describe the outcome (e.g., "You squeezed the duck and made him quack!"). Describe the steps while performing routine tasks and ask the children "What comes next?" Provide activities, songs, stories, materials and other experiences multiple times so children become familiar with them and can participate. Establish rituals to engage the children in routine activities (e.g., sing a "clean-up" song, or when caregiver sits in the rocking chair, it's time for story, etc.).
Older Toddlers Recall information over a longer period of time without contextual cues. Reenact a sequence of events accomplished or observed at an	Display a picture schedule of daily routines and ask children what happens next throughout the day. Provide dramatic play props and invite children to "play" previous events or experiences.

earlier time. Anticipate routines. Link past and present activities.	Invite children to reenact a favorite story using props or flannel board pieces, etc. Play simple "memory" games with children, remembering that individual achievement is more important than having a winner. Engage children in reflecting upon previous experiences while doing a present activity (e.g., while exploring the seeds in a small pumpkin, say, "Remember when we visited the pumpkin patch and picked out this pumpkin?"). Engage children in conversations about what has happened in their home environments. Establish rituals to engage the children in routine activities (e.g., sing a "clean-up" song, or when caregiver sits in the rocking chair, it's time for story, etc.).
Pre-Kindergarten Communicate about past events and anticipate what comes next during familiar routines and experiences. With modeling and support remember and use information for a variety of purposes. Recreate complex ideas, events/situations with personal adaptations.	Display a daily schedule with pictures and words describing daily routines. Invite children to use it independently to find out what comes next. Engage individuals or small groups of children in conversations about events that occurred at home. Invite children to recall and discuss classroom events and experiences and their reactions/feelings, etc., (e.g., a classroom visitor, an outdoor experience). Provide a variety of materials and props in the dramatic play area, invite the children to reenact stories, dramatize events or experiences, providing support as they establish and assign roles, plan the scenario and develop and act out the plot. Invite children to express their recollections, thoughts and ideas using a variety of methods and materials (e.g., construction, dramatic play, art, writing, sculpting, etc.).

	Provide directions to accomplish a task using an increasing number of steps (e.g., 1. "Wash your hands for lunch." 2. "Wash your hands and find a seat at the table for lunch." 3. "Put your coat in your cubby, wash your hands and find a seat at the table for lunch."). Support children in remembering complex directions by reminding them of next steps, etc.
Symbolic Thought	
Infants Explore real objects, people and actions.	Provide interesting, colorful objects and toys around room to capture infants' attention. Provide a clean, safe environment where babies can explore safely. Provide space in the environment for infants to move (e.g., crawl, pull-up, stand, walk, etc.). Introduce new toys or objects. Invite the baby to play. Place mirrors at eye level when babies are on the floor. Encourage children to explore objects with all senses (e.g., mouth, touch, smell, manipulate).
Young Toddlers Use one or two simple actions or objects to represent another in pretend play.	Describe an alternative use for familiar objects (e.g., "Could you use this pan for a drum?" or "I wonder if this blanket would work as a cape?"). Provide props, colorful fabrics and other open-ended materials to encourage pretend play.

	Encourage children to move materials from one classroom area to another to support pretend play (e.g., blocks in the house corner to serve as the telephone). Question to encourage symbolic thinking (e.g., "I wonder how else we could use this blanket?" or "I hear that you want a cape, what could we use?"). Use sounds during stories, songs and finger plays and invite the children to repeat the sounds and join in (e.g., "Chug, chug" while reading *The Little Engine that Could*, or create animal sounds while singing *Old MacDonald had a Farm*).
Older Toddlers Engage in pretend play involving several sequenced steps and assigned roles.	Participate with children during pretend play of familiar scenarios, verbalizing what is happening, and asking questions about what might come next (e.g., "Jasmine has her purse, she must be going to the store. I wonder what she'll buy."). Provide ample time, choices, props and materials to support pretend play of familiar events or experiences both indoors and out. Remind children about a previous event and invite them to play about it. Support the play by asking what they might need, etc. Provide materials, opportunities and support for children to engage in pretend play together (e.g., two "moms" cooking dinner side-by-side in the house corner). Encourage children to discuss their play. Provide props and materials and invite the children to act out favorite parts of a story or book. Encourage imagination by suggesting creative movements

	(e.g., move like a cat in the grass, fly like a bird, etc.). Provide toys that represent real objects in all areas of the classroom (e.g., vehicles in block area, play phone in house corner, etc.).
Pre-Kindergarten Demonstrate understanding that symbols carry meaning and use symbols to represent thinking (e.g., drawings, construction or movement). Participate cooperatively in complex pretend play, involving assigned roles and an overall plan.	Participate with children in simple games with rules (e.g., lotto, "path" games, etc.). Provide architectural drawings, photographs or other graphics in the block area to provide inspiration for building. Invite each child to select a symbol to represent him/her and place it on his/her cubby, sign-in sheet, etc. Provide a variety of props and materials in the dramatic play area to encourage pretend play with others. Rotate materials regularly. Provide a variety of construction, art, natural and found materials and invite children to use them to represent their thoughts, ideas and to create representations to support their play. Schedule large blocks of time for cooperative pretend play, and allow the children to leave the scenario, props or structures in place over several days to extend the complexity of the play. Provide opportunities for children to purposefully plan their play: Where in the classroom they will play? What they might do/build/pretend? Who they would like to invite to join them? Support children's planning pretend play by asking guiding questions about the scenario, the players and the "script." Engage the children in a discussion of feelings using

| | photographs to represent emotions (e.g., happy, sad, irritated, surprised, anxious, frightened, etc.).

Point out where icons on the computer/iPad are used to represent functions.

Support children in dramatizing particular roles using "role cards" (e.g., baby, cat, dog, falling leaf, etc.). |
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| *Reasoning and Problem Solving* | |
| Infants

Actively use the body to find out about the world. | Provide engaging materials for children to explore.

Provide space for infants to move around.

Provide surfaces in a variety of textures (e.g., carpet squares of different piles, contact paper sticky-side up, etc.).

Allow infants to mouth, shake and manipulate a variety of objects and toys. |
| Young Toddlers

With modeling and support, use simple strategies to solve problems. | Provide knob puzzles, shape sorters, etc., and support children in turning pieces in different ways until they fit.

Read stories involving characters solving problems, identify the problem and talk about how the character solved it.

Acknowledge when a child completes a puzzle, figures something out or solves a simple problem on his/her own.

Pose questions about how to solve a problem (e.g., "How do you think we can reach the car under the toy shelf?"). |
| Older Toddlers | Remind the child about previous similar situations and how he/she solved the problem. |

In familiar situations, solve problems without having to try every possibility while avoiding solutions that clearly will not work.	Ask "What if…" or "I wonder…" questions. Provide ample time for children to figure out a solution, offering encouragement but not answers. Read stories and books about characters that solved problems. Discuss both the problem and how it was solved.

Pre-Kindergarten	Support children in remembering previous experiences and how they accomplished tasks.
Demonstrate ability to solve everyday problems based upon past experience.	Ask children about the process they used to solve a problem (e.g., "What were you thinking when you decided to use wire to hold the sail?").
Solve problems by planning and carrying out a sequence of actions.	Provide opportunities for children to create play plans: where I will play, what I plan to do there, who I will play with, etc….
Seek more than one solution to a question, problem or task	Allow children to revisit their plans and discuss whether they were carried out. (Plan, Do, Review - High Scope)
Explain reasoning for the solution selected.	Encourage children to develop alternative solutions to accomplish a task (e.g., ask "What did you try? What else might you try?").
	Ask "I wonder…" questions, allowing children time to think about alternatives.
	Ask questions to inspire creative thinking (e.g., "How do you catch an elephant?" or "How can we make the clay horse stand up?"
	Encourage children to use materials in new ways to accomplish a task.

Mathematics
Number Sense
Number Sense and Counting

Infants	• Provide a variety of objects and materials for exploration.
	• Sing and say songs, chants, rhymes, poems and finger

Explore objects and attend to events in the environment	plays.
	• Playfully direct baby's attention to interesting objects and events.
	• Play disappearing and reappearing games (e.g., Peek-a-Boo, cover objects with a blanket and uncover).
	• Model and invite children to explore objects and toys in different ways (e.g., touching, banging, shaking and rolling helps them learn how things work; describe baby's actions, "You got the car to move by pulling the string!").
	• Be deliberate in developing children's English vocabulary by touching objects or demonstrating concepts as you model what the child did.
<u>Young Toddlers</u> Pay attention to quantities when interacting with objects	• Sing and say counting songs, chants, rhymes, poems and finger plays. • Model stable-order counting during routine classroom experiences and in play. Encourage children to repeat counting aloud with you.
<u>Older Toddlers</u> Show understanding that numbers represent quantity and demonstrate understanding of words that identify how much. Use number words to indicate the quantity in small sets of objects (e.g., two, three) and begin counting aloud.	• Sing and say counting songs, chants, rhymes, poems and finger plays. • Model stable-order counting during routine classroom experiences and in play. • Provide counting opportunities in other languages also, since many English language learners may already be counting in their native languages. • Provide multiple opportunities and a variety of materials and manipulatives for counting.
<u>Prekindergarten</u> Count to 20 by ones with increasing accuracy. Identify and name numerals one-nine.	• Sing and say counting songs, chants, rhymes, poems and finger plays. • Model stable-order counting during routine classroom experiences and in play using concrete objects. • Encourage English language learners to repeat counting aloud with you; repetition and use of the language are key

Identify without counting small quantities of up to three items. (Subitize)

Demonstrate one-to-one correspondence when counting objects up to 10.

Understand that the last number spoken tells the number of objects counted.

Identify whether the number of objects in one group is greater than, less than or equal to the number of objects in another group up to 10.

for English language learners' language and concept development.

- Provide opportunities for children to name numbers presented as written numerals (e.g., present number card with the numeral five and ask "What number is this?").
- Provide opportunities to demonstrate/practice one-to-one correspondence during routines (e.g., ensuring each child has a napkin at snack).
- Provide opportunities for the children to find the same number of objects as that represented in a prompt or model (e.g., select three crackers to match the picture of three crackers in a rebus snack chart, or counting napkins for the number of seats at the snack table).
- Provide multiple opportunities and a variety of materials and manipulatives for counting aloud.
- Ensure English language learners get ample opportunity to vocalize numbers during activities, not just hear them…employ multiple modalities and repetition in learning times).
- Invite the children to participate in counting games.
- Play gross motor games where children roll a large cube with quantities of dots (die) and move an equivalent number.
- Read counting books during shared reading, pausing to count items in the story or informational text. (Introduce key vocabulary to English language learners prior to activity so they can concentrate on learning to associate the number word with the number symbol, participate in counting, and not be distracted by too many unknown words in the text.)
- Add authentic props to dramatic play to familiarize children with numerals (e.g., menus, price lists, telephone and

	phone numbers, etc.).
	• Question children to determine quantity within the context of daily experiences and conversations.
	• Provide opportunities for children to identify small quantities of items without counting.
	• Encourage children to create and compare sets and explore number relationships in many contexts (e.g., during dramatic play or snack).
	• Count and compare the numbers of letters in the children's names.
	• Using concrete objects, model comparative language such as "greater than," "less than" and "same as or equal to."
	• Encourage children to create and compare sets (e.g., "I have five blocks, you have six blocks. Who has more?").
Number Relationships and Operations *Number Relationships*	
Infants Explore objects and attend to events in the environment.	• Provide a variety of objects and materials for exploration. • Sing and say songs, rhymes, poems and finger plays. • Playfully direct baby's attention to, touch or point out and label interesting objects and events. • Read interactive story books like *Pat the Bunny*.
Young Toddlers Notice changes in quantity of objects (especially ones that can be detected visually with ease).	• Model quantity language during daily routines and play (e.g., "Do you want more Cheerios®?" "You have a lot of blocks." "Are your Cheerios® all gone?" "You have two crackers."). • Draw children's attention to changes in quantity, asking "Where did it go?" when you move the ball behind you. • With one puppet on each hand, playfully put one behind your back, then the other, then both, engaging the children with "Where's Mr. Bear? Here he is! Uh oh…where'd they go?" prompts to draw their attention to the changes in quantity.

	• Read sturdy lift-the-flap (e.g., *Spot Goes to the Farm* or *Peek-a-Boo, You*") or "hello/goodbye" board books.
<u>Older Toddlers</u> Demonstrate an understanding that *adding to* increases the number of objects in the group. Place objects in one-to-one correspondence relationships during play.	• Read children's literature selections illustrating the concept of more or "adding to." (e.g., *The Hungry Caterpillar*). • Model and verbalize "adding to" language during daily routines and play (e.g., "I'll add a block to the basket, then you add a block, I'll add a block, then you add a block. Wow! The basket is really full!"). • Model placing objects in one-to-one correspondence during play (e.g., put one truck on each block in a row, or give each baby doll a bottle in the house corner.) • When you are distributing items, emphasize the concept of one-to-one correspondence: "One for you, one for me, one for Tyler." Or, "Let's put on your shoes: one, two."
<u>Pre-Kindergarten</u> Count to solve simple addition and subtraction problems with totals smaller than eight, using concrete objects.	• Model mathematic vocabulary in conversation, using concrete objects and other visuals, within the context of daily routines and play (e.g., joining, more than, less than, equal to, same as, groups, bigger and smaller, taller, shorter, etc.). • Use flannel board pieces and/or concrete objects to group and count sets or demonstrate grouping (e.g., three dogs and two cats equals five animals; four dogs and one cat equals five animals or act out *Ten in the Bed* using concrete objects). • Pose and solve addition and subtraction problems within the context of real situations in the classroom (e.g., "How many people will be at the snack table if Jenny comes?"). • Solve simple addition and subtraction problems based on the counting sequence (add one or subtract—take away— one).

Algebra *Group and Categorize*	
Infants Notice differences between familiar and unfamiliar people, objects and places	• Design the environment for safe exploration and interaction with materials. • Stay near children but encourage them to separate and seek out toys or objects. • Introduce new adults in the comfort of familiar adults and environments. • Avoid sudden changes to routines or adults.
Young Toddlers Match two objects that are the same and select similar objects from a group.	• Provide pairs of objects and multiples of materials for matching. • Model matching objects and describe similarities. • Prompt children to look for similarities (e.g., "Find the mitten that looks just like this." Or, "Can you find your other shoe?"). • Provide shape sorters and other materials designed to promote matching.
Older Toddlers Sort objects into two or more groups by their properties and uses.	• Provide pairs of objects and multiples of materials for sorting and classifying. • Model sorting by one attribute (e.g., "red" and "not red," or "round" and "not round"—or by simply creating a set of the red items and all the round items). • Invite children to sort and organize objects into groups by one attribute (e.g., color, size, shape, function).
Pre-Kindergarten Sort and classify objects by one or more attributes (e.g., size or shape).	• Provide a variety of manipulatives, objects, and natural and found materials for sorting and classifying. • Model sorting and classifying language and conversation to compare attributes in everyday play or group experiences. • Explicitly teach English language learners English shape, size, color, etc., vocabulary, acknowledging that they may know that vocabulary in their home languages. • Invite children to sort and organize collected materials by color, size, shape, etc., and ask them to count to find

	which group has the most. • Use "not" language to help children sort by one attribute (e.g., "These bears are all red, and these bears are NOT red."). • Provide opportunities within the context of daily routines and play to observe and count children and objects in groups. Examples might include: "How many children are at school?" "How many are at home?" "How many girls are here?" "How many boys?" Expand one-word answers modeling complete sentences (e.g., "Yes, there are 5 girls here."). • Consider times for choosing and storing toys as on-going opportunities for children to sort and match or order and classify materials (e.g., putting blocks of the same shape in the appropriate spaces on the block shelf; putting dramatic play materials away based on their functions, such as food items together, dishes together and dress-up clothes sorted by type).
Patterning	
<u>Infants</u> Imitate repeated movements	• Sing and say songs, chants, poems, rhymes and finger plays with simple movements. • Invite baby to attend to and play simple games with movements (e.g., Patty-Cake, Peek-a-Boo).
<u>Young Toddlers</u> Participate in adult-initiated movement patterns.	• Invite children to participate in movement songs and games (e.g., "Wheels on the Bus" or "Where is Thumbkin?"). • Read stories that have movement patterns (e.g., *From Head to Toe*). • Verbalize the pattern sequence in daily routines (e.g., "Off comes the dirty diaper, use a wipe to clean you up and now a brand new diaper! That feels better!")

Older Toddlers Copy and anticipate a repeating pattern.	• Provide a variety of materials and objects—including natural and found materials—for patterning (e.g., pattern blocks, picture cards, shells, bottle caps, marker lids, etc.). • Point out patterns during daily routines (e.g., as you get ready to go to the playground: "First we fill our bag with toys, then we put on our shoes and coats, then we turn the lights off, then we go out the door and walk to the playground." • Model creating a simple A-B pattern and invite the child to make one that looks the same. • Model creating a simple A-B pattern and invite the child to select what comes next.
Pre-Kindergarten Recognize, duplicate and extend simple patterns using attributes such as color, shape or size. Create patterns.	• Point out patterns in the environment (e.g., tile floors, brick patterns on buildings, patterns on clothing, jewelry, decorations, the sun is out during the day vs. the moon is out at night, etc.) and discuss the features of a pattern. • Provide children opportunities to participate in daily routines (e.g., setting the table for snack, preparing for naptime or clean-up). • Sing, dance, clap, chant and move with children to different rhythmic patterns. Include those that are representative of ethnic and cultural backgrounds of the group. • Model patterning with objects and materials and invite the children to duplicate and extend the patterns, encouraging them to create patterns of their own. Encourage children to verbalize the structure of the pattern. Model/narrate what the child is doing as appropriate. • Provide collections of materials and manipulatives for children to make their own patterns across the curriculum (e.g., art materials, pattern blocks, unfix cubes, attribute blocks, picture cards, buttons, keys, nuts, etc.).
Measurement and Data *Describe and Compare Measureable Attributes*	
Infants	

Explore properties of objects.	• Provide a variety of objects and materials for exploration. • Sing and say songs, chants, rhymes, poems and finger plays. • Playfully direct baby's attention to interesting objects and events. • Play disappearing and reappearing games (e.g., Peek-a-Boo, cover objects with a blanket and uncover). • Model and invite children to explore objects and toys in different ways (e.g., touching, banging, shaking and rolling helps them learn how things work; describe baby's actions, "You got the car to move by pulling the string!").
Young Toddlers Show awareness of the size of objects.	• Provide similar toys and materials in a variety of sizes (e.g., balls, blocks, cars, etc.). • Label objects by size (e.g., "You have the big ball and Jason has the little ball.").
Older Toddlers Demonstrate awareness that objects can be compared by attributes (e.g., size, weight, capacity), and begin to use words such as bigger, smaller and longer.	• Provide toys and materials that can be compared. • Model using comparative language to describe attributes of objects (e.g., bigger, smaller, shorter, taller, etc.). • Sort objects by one attribute (e.g., littlest toy farm animals, long blocks). • Explicitly teach vocabulary to English language learners with visuals and concrete objects.
Pre-Kindergarten Describe and compare objects using measureable attributes (e.g., length, size, capacity and weight). Order objects by measureable attribute (e.g., biggest to smallest, etc.). Measure length and volume (capacity) using non-standard or standard measurement tools.	• Relate measurement language to children's interests, experiences and prior knowledge versus abstract ideas and data. • Provide a variety of manipulatives and collections of natural and found materials for exploration and comparison of attributes. • Model and encourage the use of comparison language (e.g., bigger/smaller, longer/shorter, heavier/lighter) in the context of daily experiences and play (e.g., "This block feels heavier than that book. I wonder if this block tower is taller than the table." • Provide opportunities for children to sort and classify in the context of daily routines and play (e.g., at clean-up time,

	children sort blocks by size and shape for stacking on the labeled block shelves).
	• Provide opportunities to describe and compare attributes of objects.
	• Provide collections and sets of materials (e.g., measuring cups and spoons, nesting blocks, beads) that can be sorted, ordered and classified by one attribute. Ask the children to describe how they are sorting and/or ordering the items.
	• Read stories in which size relationships play an important part and encourage children to represent stories using real objects (e.g., doll house furniture to retell *The Three Bears*).
	• Invite families of English language learners to visit and read familiar stories like *The Three Bears* in their home languages.
	• Provide non-standard containers and cups of various sizes in the sensory table to determine how many of the small cups a large container will hold.
	• Encourage measurement using non-standard measuring devices (e.g., use one-inch Unifix cubes to determine how tall the amaryllis plant is).

Data Analysis

Pre-Kindergarten	• Provide interesting materials for sorting and comparing.
	• Model sorting and classifying language and conversation to compare attributes in everyday play or group experiences.
Collect data by categories to answer questions.	• Invite children to sort and organize collected materials by color, size, shape, etc., and ask them to count to find which group has the most or least. (Intentionally clarify the concepts "most" and "least" for English language learners)
	• Explore graphing by arranging objects within a floor and/or table graph.
	• Engage the children in conducting surveys of their peers (e.g., "Do you have a pet?" Or, a more complex survey,

	"What kind of pet do you have?").
	• Create graphs to organize data (e.g., graph the outcome of the surveys; the number of children who have a pet and the number of children who do not, etc.).
	• Model analyzing the graph to answer questions.
Geometry *Spatial Relationships*	
<u>Infants</u> Explore the properties of objects	• Provide a variety of objects and materials for exploration. • Sing and say songs, chants, rhymes, poems and finger plays. • Playfully direct baby's attention to interesting objects and events. • Play disappearing and reappearing games (e.g., Peek-a-Boo, cover objects with a blanket and uncover). • Model and invite children to explore objects and toys in different ways (e.g., touching, banging, shaking and rolling helps them learn how things work; describe baby's actions, "When you pulled the string the car moved!").
<u>Young Toddlers</u> Explore how things fit and move in space.	• Provide manipulatives that can be put together and taken apart (e.g., knob puzzles, shape-sorters, stacking rings, etc.). • Provide opportunities and materials including their own bodies to explore movement in space. • Create a simple obstacle course.
<u>Older Toddlers</u> Demonstrate how things fit together and/or move in space with increasing accuracy.	• Provide more complex manipulatives that can be put together and taken apart (e.g., peg board/pegs, puzzles, shape-sorters, Duplo® blocks, etc.). • Provide a variety of toys with wheels (e.g., vehicles in the block area, riding toys, wagons, shopping carts, etc.). • Engage children in parachute play. • Provide opportunities and materials, including their own bodies, to explore movement in space.
<u>Pre-Kindergarten</u>	• Model and encourage positional vocabulary (e.g., up, down, over, under) in conversation and in the context of

Demonstrate understanding of the relative position of objects using terms such as in/on/under, up/down, inside/outside, above/below, beside/between, in front of/behind and next to.	daily routines and play. • Provide opportunities and materials to explore spatial concepts by moving objects, including their own bodies, through space (e.g., obstacle course or treasure hunt). • Select children's books that use "spatial language" (e.g., *Going on a Bear Hunt, Inside Outside Upside Down*).

Identify and Describe Shapes

Older Toddlers Recognize basic shapes.	• Provide shape-sorters, knob shape puzzles and other shape manipulatives. • Read picture books like *Shapes, Shapes, Shapes* or *So Many Circles, So Many Squares*. • Go on a "shape hunt" and find examples of common shapes (e.g., circles, squares, triangles). • Encourage play sorting and matching shapes (e.g., pattern blocks, tangrams, cut/laminated paper shapes, etc.).
Pre-Kindergarten Understand and use names of shapes when identifying objects. Name three-dimensional objects using informal, descriptive vocabulary (e.g., "box" for cube, "ice cream cone" for cone, "ball" for sphere, etc.).	• Introduce and label a wide variety of two and three-dimensional shapes pointing out and discussing distinctive features. • Provide a variety of regularly-shaped materials and manipulatives. • Encourage play experiences sorting and matching shapes. • Listen for children's use of "shape talk" or vocabulary describing two and three dimensional shapes occurring during play (e.g., building in the block center, painting/drawing in the art center). • Provide well-designed learning experiences, learning centers and guided conversations where children explore, predict and reason about geometric ideas (e.g., a "shape hunt" to match a given shape in the classroom environment, continuing patterns with geometric shapes).

Analyze, Compare and Create Shapes

Pre-Kindergarten	• Model and encourage conversation describing and

	comparing the sizes and orientations of two- and three-dimensional shapes.
Compare two-dimensional shapes, in different sizes and orientations using informal language. Create shapes during play by building, drawing, etc. Combine simple shapes to form larger shapes.	- Encourage children to make and talk about models created with blocks and toys. - Provide two- and three-dimensional shapes for children to explore, questioning where they might find the two-dimensional shapes "in" the three-dimensional shapes. - Watch for shape-making play using a variety of manipulatives (e.g., tangrams, puzzles, pattern blocks) and listen for "shape talk." - Scaffold children's use of descriptive language, modeling mathematical language. - Provide blueprints, architectural models, photographs and other authentic props and engage the children in exploring the presence of shapes. - Provide a variety of art media and materials for children to use to model, construct and draw familiar shapes in the learning environment indoors and outdoors. - Provide materials (pattern blocks, tangrams, geometric solids, etc., appropriate for combining shapes to form larger shapes). - Build shapes using sticks, clay or other materials.

Social Studies Self *Social Identity*	
<u>Infants</u> Show awareness of self and others.	- Mount mirrors on the wall so babies can see their images while lying on the floor. - Call baby's attention to reflection in the mirror, call him/her by name and describe body parts. - Refer to other infants and adults by name, describe their actions (e.g., "Miss Angie is fixing your bottle; it's almost time to eat!" or "Jasmine wants to read *Pat the Bunny* with

	us."
Young Toddlers Prefer familiar adults and recognize familiar actions and routines	• Interact with children on their level, making eye contact. • Offer toddlers simple choices. • Pay attention to children's non-verbal cues indicating preferences. • Maintain consistency of care with familiar adults. • Describe what the toddler sees, hears and does. • Acknowledge children's resistance to new situations or people. • Continue to offer familiar experiences, even if child is not interested.
Older Toddlers Identify self and others as belonging to one or more groups by observable characteristics.	• Provide opportunities to group *same* and *different* objects by one attribute. • During conversations, daily routines and play, draw children's attention to similarities (e.g., "You and Dalia are both wearing red shoes today."). • Model and support children as they study their reflections in mirrors, describing features, similarities and differences (e.g., hair/eye colors, freckles, short/long hair, etc.). • Provide opportunities for children and their families to describe their family compositions. • Invite families to provide a family picture to support the English language learner in describing his/her family or as a non-verbal means of communication. • Determine the cultural make-up of the group and design curriculum experiences and the environment accordingly (e.g., display posters of various cultures, add familiar foods to the dramatic play center and play cultural music). • Explore cultures by having lunch/snack from each culture or invite families to share music, games, languages and dress. • Using photos/pictures or other visuals, talk about the multiple groups/communities in which we live;

	home/family, classroom community, school/center community and neighborhood. • Invite families to provide a family photo. Frame and put it on child's cubby space. Talk to the children about their family structures, intentionally using "family words" like brother, sister, grandma or other words specific to the child's family.
History *Historical Thinking and Skills*	
<u>Pre-Kindergarten</u> Demonstrate an understanding of time in the context of daily experiences. Develop an awareness of his/her personal history.	• Construct the daily schedule with the children during class meeting using photos/pictures and words in English and other languages represented in the classroom. • Create an authentic monthly calendar and with the children, record important classroom events and experiences. **NOTE: Rote recitation of months, days and dates is *not* an authentic use of a classroom calendar.** • Model and support children retelling stories with an emphasis on what happened first, next, last. • Review the events of the day during closing circle. • Use words like now, later and next in the context of daily routines and experiences. • English language learners may understand these concepts in their home languages. Invite families to provide the words and correct pronunciation and incorporate them into the context of daily routines and experiences. • Work with families to construct child timelines (e.g., sequence pictures of children from birth to current age). Create a class photo album documenting classroom experiences over time; review regularly to note changes. • Mark and display growth charts in the classroom. • Create and review with each child personal portfolios of children's work samples, photos and other documentation

	to illustrate change over time.

Heritage	
<u>Pre-kindergarten</u> Develop an awareness and appreciation of family cultural stories and traditions.	• Invite families to share objects, visuals, traditions and customs that reflect their heritage. • Invite children to share and celebrate important family events (e.g., births, weddings, new pets or death). • Read books that describe a variety of those family structures, cultures and traditions represented in the learning community. • Invite English language learners' families to share books in their home languages. • Create a learning environment that is reflective of the culture, heritage and ethnicity of the members of the classroom community. • Support families in using technology (e.g., video, web-cams, digital cameras, etc.) to share events, traditions, music and other elements of their cultures.
Geography *Spatial Thinking and Skills*	
<u>Pre-Kindergarten</u> Demonstrate a beginning understanding of maps as actual representations of places.	• Read children's literature selections about places, locations and directional concepts (e.g., *Rosie's Walk*). • Provide photographs, maps, architectural drawings, signs and logos and other representations of familiar places in the blocks and dramatic play areas. • Plan a scavenger hunt using maps of the classroom, school and playground. • Invite the children to create maps in the context of meaningful experiences and play (e.g., create a treasure map; make a map of the building to guide parents coming for a class party).
Human Systems	
<u>Pre-Kindergarten</u> Identify similarities and differences of personal, family and	• Invite children to group themselves by a particular characteristic identified by the teacher to build an awareness of similarities and differences. Use props and

cultural characteristics and those of others.	visuals to promote understanding (e.g., those that have a pet; those that have a sibling, those that play a sport, those with blue/brown eyes, etc.). • Invite families to share elements of their cultures and traditions, and explore the similarities and differences. • Provide opportunities for children and families to describe and discuss the similarities and differences of their family compositions. • Describe and discuss the different elements, similarities and differences represented in the learning environment that is reflective of the culture, heritage and ethnicity of the members of the classroom community. • Send home personal photo albums for children and their families to fill with photographs of family members, customs and traditions, pets, etc. Encourage children to share and compare and contrast family characteristics with those of their peers.
Government *Civic Participation and Skills*	
Pre-Kindergarten Understand that everyone has rights and responsibilities within a group. Demonstrate cooperative behaviors and fairness in social interactions. With modeling and support, negotiate to solve social conflicts with peers. With modeling and support, demonstrate an awareness of the outcomes of choices.	• Have meaningful conversations about the importance of cooperation in working together in the learning community. Include discussions defining pro-social behaviors like taking turns, helping, sharing, etc. • Acknowledge children when they demonstrate pro-social behaviors; describe the behavior and why it is important to getting along. • Encourage children to identify those jobs and responsibilities that make the learning community function (e.g., feed the class pet, water the plants, help set up snack, etc.) and have each one volunteer to do one of them for an agreed-upon period of time. • Encourage children to form committees to accomplish tasks or be responsible for special events (e.g., the Birthday Committee is responsible for creating a special

	gift to celebrate each classmate's birthday; the Recycle Committee is responsible for making sure the recycle bin is available to collect paper scraps).
- Provide opportunities for children to work in pairs and small groups on projects of shared interest. Model and support listening, perspective-taking and negotiation to accomplish a shared goal.
- Use appropriate guidance strategies to teach children the process to solve social conflicts:
  - Approach calmly, stopping any hurtful actions;
  - Acknowledge children's feelings;
  - Gather information;
  - Restate the problem;
  - Ask for ideas for solutions and choose one together; and
  - Be prepared to give follow-up support. (High Scope 2013)
- Work with individual or small groups of English language learners to model the appropriate ways to solve social conflicts with their limited English skills. Develop teacher cues they can use when they need help; explicitly teach vocabulary, phrases, words they can use; use books that illustrate pro-social behaviors for dialogic reading focusing on related vocabulary; add in role playing as appropriate.

- Create an environment that provides opportunities for making choices in everyday experiences and play (e.g., all toys and materials are accessible and available at all times).
- Support children in identifying how their choices have consequences (e.g., Alex was so busy in the blocks that she didn't get to the art table and was upset that she didn't have a painting to take home. The teacher explained that she chose to work in the blocks instead of painting. Alex was disappointed, but the teacher assured her she could choose painting in the morning). |

Rules and Laws	
<u>Pre-Kindergarten</u> With modeling and support, demonstrate understanding that rules play an important role in promoting safety and protecting fairness.	• Engage the children in a conversation about what is a rule and why rules are important. • Invite parents of English language learners to provide you with some home "rules" that can be used as examples to make the home/language connection to rules at school. • Discuss with the children what cooperation means and listen to their ideas about how they might cooperate. • Engage the children in co-constructing meaningful rules that are necessary to keep everyone safe and support cooperation and fairness. • Gently remind children of the rules when necessary, understanding that it takes time and self-regulation skills to follow the rules all the time. • Use conflict-resolution situations to teach perspective-taking, empathy and problem solving.
Economics *Scarcity*	

<u>Pre-Kindergarten</u>
 	
With modeling and support, recognize that people have wants and must make choices to satisfy those wants because resources and materials are limited.
	• Discuss the different centers or areas in which the children chose to play. Highlight the idea that not all children chose to play in the same area or with the same materials because they are interested in and like different things.
	    o Provide clipboards with visual organizers and prompts and invite the children to keep track of/document their play for several days. Talk about their findings in class meeting. Discuss what impact this might have on the environment—are more resources necessary? Are things not regularly used? Discuss what might be done. Incorporate the children's ideas into changes in the environment to better satisfy their wants.
	    o Model and support English language learners in using organizers to document their play, and use

	objects, visuals, etc., to engage them in the conversation.
	• Prepare an art activity with too few materials for each child (e.g., three scissors and two glue sticks for five children). Engage the children in a problem-solving discussion to help them generate some strategies for sharing and taking turns with the materials.
	o With modeling and support, engage English language learners with limited English to non-verbally demonstrate solutions; support their learning by narrating what they are doing and encourage English language learners to repeat some of your language.
	• Problem-solve with the children to generate ideas to ensure that everyone gets a turn in a high-interest area or with a particularly popular material (e.g., sign up on a waiting list, assigning a length of time at the computer).
	• Ask the children how they might structure snack time so everyone's wants are satisfied (e.g., everyone takes two crackers allowing seconds for those who are still hungry).
Production and Consumption	
<u>Pre-kindergarten</u> With modeling and support, demonstrate understanding of where goods and services originate and how they are acquired. With modeling and support, demonstrate responsible consumption and conservation of resources.	• Plant seeds that are likely to produce a fruit or vegetable (e.g., tomato plant). Harvest the produce and cook something (e.g., spaghetti sauce, ketchup). • With the children using a combination of words and pictures, make a grocery list of items and ingredients needed for a cooking project. Take a trip to the store to purchase the items. • Take a field trip to a farm or orchard to pick produce; use it in a cooking project (e.g., apples for applesauce). • Recycle classroom materials (e.g., paper scraps in the art area, plastic yogurt cups after snack).

Science Science Inquiry and Application *Inquiry*	
<u>Infants</u> Examine objects with lips and tongue. Make sure objects are not choking hazards) Observe, hold, smell, touch and manipulate objects.	• Develop a system of toy sanitation that allows children to safely manipulate objects in a variety of ways. • Place objects at varying distances and positions within infants' reach. • Maintain an appropriate number and variety of objects and materials, rotated regularly as infants' abilities and familiarities with objects change. • Ensure toys and materials are accessible for mobile and non-mobile children. • Provide items of various textures, colors and patterns appropriate for mouthing.
<u>Young Toddlers</u> Try different things with *(manipulate and test)* objects to see what happens or how things work. Notice and observe the surrounding physical and natural world.	• Provide sensory activities with a variety of objects, materials and tools for manipulation and exploration (e.g., sensory table filled with sand/water and cups for scooping; light table with a variety of colorful opaque and transparent objects; shiny, silky, soft and textured fabrics; scented materials or "scent" bottles; rattles, shakers, bells and other auditory items in clear or opaque boxes that can be easily opened and closed). • Encourage and model playing "kitchen band" items to strike, shake, pound, etc. Identify objects and verbalize actions to build vocabulary. • Offer items that require use of both large and fine motor skills. • Introduce and describe new objects and materials and

	- invite exploration. - Engage the children in conversations about what is happening in the indoor and outdoor environments. - Encourage children to look out windows. Identify and describe what they see. - Ensure that objects and materials are rotated frequently and are accessible. - Provide a science table or science center with a variety of authentic experiences and meaningful, natural materials to explore (e.g., in the fall, have pumpkin pie pumpkins that are whole and cut apart).
Older Toddlers Engage in sustained and complex manipulation of objects. Engage in focused observations of objects and events in the environment. Ask questions about objects and events in the environment. With modeling and support, use simple tools to explore the environment.	- Provide extended periods of time for play and exploration. - Offer a variety of natural and found materials for exploration (e.g., rocks, shells, seed pods, soil, leaves, sticks, plants, etc.). - Model and describe making observations of objects or events using explicit vocabulary. - Model asking open-ended questions to stimulate thinking and inquiry. - Encourage children to ask questions about objects, events and other phenomena in the indoor and outdoor environment and scaffold how to act upon these questions to design explorations around these questions. - Invite children to document and discuss their observations through drawing, sketching, sculpting with clay or play dough, writing, etc. - Provide magnifiers, collection jars, shovels and other simple tools to support exploration.
Pre-Kindergarten With modeling and support, engage in scientific inquiry: Explore objects, materials and events.	- Envision and support children as capable. - Value the process of discovery as supporting scientific learning, even if the process does not seem to be the most efficient - Model and encourage a sense of wonder about nature, the world and science.

- Make careful observations.

- Pose questions about the physical and natural environment.

- Engage in simple investigations.

- Describe, compare, sort, classify and order.

- Record observations using words, pictures, charts, graphs, etc.

- Use simple tools to extend investigation.

- Identify patterns and relationships.

- Make predictions.

- Make inferences, generalizations and explanations based on evidence.

- Collaborate and communicate with peers.

- Share findings, ideas and explanations (may be correct or incorrect) through a variety of methods (e.g., pictures, words, dramatization).

- Listen to children's questions to guide course of study.
- Use the process of webbing with children to expand their thinking, vocabulary and questioning skills.
- Ask open-ended, guiding questions to promote investigative questions and deductive thinking (e.g., "What do you notice?" "What might happen if…?")
- Allow children enough "wait time" to think before responding.
- Validate all answers whether correct or incorrect as children begin to explore and discover answers.
- Create a classroom that maintains a warm, accepting and nurturing atmosphere where all questions are important and investigation and exploration are valued.
- Encourage English language learners to express their questions through drawings, gestures, phrases and whatever means available to them to communicate their inquiries and ideas.
- Emphasize child-initiated, authentic, first-hand experience and exploration rather than science taught by the teacher.
- Create project-based learning opportunities.
- Provide learning experiences in many modalities and learning styles.
- Keep children actively involved.
- Put emphasis on relationships with ourselves (feeling self-assured), with others (sharing and learning from each other), and our world (how we impact our surroundings).
- Ensure that children have their own logbooks to record their thoughts and pictures as they work.
- Encourage children to ask "How?" and "Why?" questions. Support English language learners comprehension by incorporating words from their home languages for "how" and "why"; use them together.
- Encourage children to explore how organisms live and record their observations through a variety of media (e.g., dance, music, stories, poetry, drawing, sketching, charts, graphs, photographs, recorded conversations and

	observations).
	• Encourage children to use scientific thinking processes: asking questions, gathering evidence to address these questions and making sense of the evidence to understand what is happening.
	• Take advantage of questions and curious comments as opportunities to engage in scientific study, observation and experimentation rather than simply telling children the "right" answers (e.g., answering with, "Why do you think…?" Or, "How could we find out?").
	• Support children in their exploration by providing resources, materials, time, opportunities and activities that help children discover solutions and maintain enthusiastic interest.
	• Plan activities in response to children's ideas that will help them discover solutions.
	• Encourage children to share their ideas and explanations with others through a variety of means and modalities (e.g., pictures, clay, puppets, log books, show and tell).
	• Support children's ideas and explanations whether correct or incorrect, and guide them with open-ended questions to discover their own corrections. Model language.
	• Capitalize on naturally occurring events as opportunities to explore helpful/hurtful actions (e.g., dead fish in the aquarium, size differences among plants, worms on the sidewalk).
	• Explore ways to improve conditions for living things in and around the classroom through active involvement in care (e.g., taking proper care of classroom pets, constructing and observing activity at bird feeders, tending a garden).
	• Provide a variety of easily accessible materials and resources that children may use to extend their explorations (e.g., for experimenting with bubbles, provide bubble solution, cups, trays, straws, funnels, turkey basters, sieves, mesh and bendable wires).
	• Allow extended time for in-depth exploration when

	children are engaged in experimentation and discovery.
	• Provide opportunities, materials and technology (e.g., iPads, digital cameras, computers) for children to record/represent their findings.

Cause and Effect	
<u>Infants</u> Use simple actions to make things happen.	• Provide toys and materials to touch, feel, grasp and move. • Hang a mobile over the diapering area, tie a ribbon to it and let the infant pull on the ribbon to see what happens. • Describe how infant's action made something happen (e.g., "You squeezed the duck to make it quack." "If you pound on the table or a plastic bucket, it makes a sound and the sounds are different."). • Fill clear bottles with water and interesting items (e.g., glitter, shells, colorful plastic fish, dry pasta) and encourage children to shake or roll to create movement and sounds. • Provide opportunities for baby to initiate movement to indicate desire for continuation of activity.
<u>Young Toddlers</u> Purposefully combine actions to make things happen.	• Provide opportunities and support for children to perform actions repeatedly (e.g., sing repeating songs or perform dances with repeated steps to create different sounds). • Provide or create "pop-up books" and read aloud with individuals and small groups. • Provide toys that produce a response to an action and toys that produce different responses to actions (e.g., rolling balls through differently sized or shaped tubes or tubes that are closed at one end vs. open). NOTE: Toys should NOT BE BATTERY OPERATED to encourage exploration beyond pushing a button. • Model and support exploration and actions to make things happen. • Provide blocks for stacking and tubs and buckets for filling and emptying.

Older Toddlers	• Ask questions or provide information for children to consider (e.g., "What might happen if you put the big block on the bottom? Let's try it and find out!" "How do you think the ball will move if we push the ramp higher? Lower?")
Demonstrate understanding that events have a cause.	• Talk about and explore alternative solutions to problems.
Make predictions.	• Ask questions such as 'What might happen if…" or "Can you find a way to…?" Encourage children to explore these alternatives using concrete objects.
	• Describe the effects of an action (e.g., "What are some things that might happen if you don't keep all of the chair's legs on the floor?").
	• Place pinwheels in different directions to see which direction makes the pinwheel go the fastest/slowest.
	• Take two different balls of similar size and have children predict which ball will roll the farthest.
	• Put water in the sensory table and include funnels, containers and floating/sinking objects of various shapes and sizes.

Earth and Space Science
Explorations of the Natural World

Pre-Kindergarten	• Encourage children to use all their senses in exploring the weather (e.g., the sound of thunder, the feel of snow on your face, how the wind pushes against your body, how the temperature changes and how the atmosphere darkens when a cloud moves in front of the sun, etc.).
With modeling and support, recognize familiar elements of the natural environment and understand that these may change over time (e.g., soil, weather, sun and moon).	• Provide English language learners with descriptive words with accompanying pictures for them to use to associate the sense response with vocabulary words in English.
With modeling and support, develop understanding of the relationship between humans and nature; recognizing the difference between helpful and harmful actions toward the natural environment.	• Provide children with materials and opportunities to record observations through sketching, writing and drawing.
	• Before taking nature walks to address children's questions about changes in the environment ask the

	children: "What do you think we might see?" "What kind of things should we collect?" After the nature walk discuss what happened, compare to predictions, examine collections, etc. • Infuse environmental responsibility *in all aspects* of the curriculum. • Reuse and recycle materials in the classroom. • Engage children in projects to help the environment, such as playground clean-up. • Conduct experiments to illustrate helpful and harmful actions and the impact on the environment (e.g., place lunch napkins in a large jar of clean water, put the lid on and observe and document what happens to the water over time). • Use children's literature selections in languages representative of the group, with high-quality illustrations or photographs that have simple language to teach stewardship and environmental consciousness. • Using high-quality pictures or photographs, make monthly graphs of weather conditions (sunny, cloudy, snowy, rainy). Be sensitive to those children who may never have experienced snow. • Provide opportunities for shadow play using both natural and artificial light. • Initiate discussions, sorting, and graphing or charting activities done during night and day. • Provide flannel board activities and puzzles of things to do at night and during the day. • Play recorded sounds of day and night so the children can dance, move or draw to them. • Track movement of the sun by placing an object on the window and map the movement of the shadow throughout the day. • Walk/hike to different locations to see how the sun moves/changes. • Display maps of the night sky.

	• Encourage children to observe the moon with their eyes, binoculars and telescopes and record moon phases.
	• Take the children on field trips to a planetarium or observatory. Before the trip, using photos, videos, etc., explain what a planetarium and observatory are and introduce relevant vocabulary to make the trip meaningful.
	• Collect rocks such as sandstone or granite and use tools like magnifying glasses or paper for rubbings to compare properties (e.g., texture, density, color and other properties).

Physical Science
Explorations of Matter and Energy

<u>Pre-Kindergarten</u> With modeling and support, explore the properties of objects and materials (e.g., solids and liquids). With modeling and support, explore the position and motion of objects. With modeling and support, explore the properties and characteristics of sound and light.	• Provide parts of familiar objects for children to identify (e.g., knob from dresser; pedal from bicycle). • Provide many different sensory experiences in the classroom (sensory table, feely box, sound identification games, smell identification games, film canisters with items inside). • Create simple machines from classroom and found materials to explore motion (e.g., lever, wheel and axle, pulley, inclined plane, etc.). • Engage in simple cooking experiences to observe solids, liquids, gasses and to watch substances change between the three stages of matter. • Provide different sources of light for exploration (e.g. overhead projector, flashlight). • Provide opportunities to watch snow and ice melt. Note changes and rate of change. Vary with material such as salt. • Provide opportunities for children to discover how things work by taking apart and putting together many different objects (e.g., toy vehicles, old appliances). Introduce new vocabulary, narrate actions and describe objects.

	Encourage children to use new vocabulary.
	• Provide a variety of purposeful materials in the sensory table, such as soil, sand, clay, cotton, pebbles, rocks, sponge pieces, cups and water.
	• Provide opportunities for children to explore manipulating their own voices by changing pitch, volume or quality (e.g., talk into different lengths of cardboard tubing, talk with wax paper against lips, talk into a kazoo).
	• Provide opportunities for children to explore resonance by making sounds with various materials (e.g., compare striking instrumental wood blocks and blocks of wood; using different mallet types such as wood, hard felt, soft felt, sponge, rubber).
	• Provide materials to explore timbre with different maracas and dynamics with different rattles.
	• Provide materials for experimenting with water levels in glasses to make different sounds.
	• Provide opportunities for children to be active explorers of their environment. Give them tools to use such as magnifying glasses, cardboard tubes as viewers, spray bottles to note changes from water, bottomless paper cups to use as sound catchers against ear.
	• Provide materials for constructing instruments, such as rubber bands strung across a shoebox and empty containers with various fillers (pasta, marbles, rice, stones, etc.).
	• Be deliberate in supporting English language learners' language development for all explorations, experiments, and sensory experiences. Don't assume they know or understand the words being used. Help them make the connections through formal and informal methods employing photos, pictures, labeling, one-to-one teacher "talks," language peer support, etc.

Life Science
Explorations of Living Things

Pre-Kindergarten	• Provide a variety of living things in the classroom (e.g., gerbils, fish, ants, earthworms, plants) for children to care for and meet their needs, as well as make and record observations about.

Pre-Kindergarten

With modeling and support, identify physical characteristics and simple behaviors of living things.

With modeling and support, identify and explore the relationship between living things and their environments (e.g., habitats, food, eating habits, etc.).

With modeling and support, demonstrate knowledge of body parts and bodily processes (e.g., eating, sleeping, breathing, walking) in humans and other animals.

With modeling and support, demonstrate an understanding that living things change over time (e.g., life cycle).

With modeling and support, recognize similarities and differences between people and other living things.

- Provide a variety of living things in the classroom (e.g., gerbils, fish, ants, earthworms, plants) for children to care for and meet their needs, as well as make and record observations about.
- Collect leaves (which may be pressed in wax paper or used for rubbings) to make comparisons and sort by size, shape, color, etc.
- Explore why leaves might be different (e.g., leaves from deciduous trees vs. pine needles, etc.); then ask children to consider why the different leaf structures exist.
- Read and discuss children's books such as *Be Nice to Spiders* (Graham, 1967) to encourage appreciation for living things.
- Provide opportunities to explore nature such as taking a bird walk to observe and discuss ways that the environment supports birds. Discuss ways to support the habitat of the birds (e.g., Do the children notice that the birds need a place to perch? To bathe? To exercise? Do different birds need different things?).
- Take children on guided field trips (e.g., zoo, children's museum, farm) to demonstrate common needs of living things (e.g., cows on farm eating grass).
- Use photographs, pictures, etc. to categorize animals by various needs (e.g., food, habitats).
- Cut open fruit/vegetable and plant seeds to identify needs of the plants as the seeds grow.
- Explore the ways animals move; compare that to the way humans move.
- Using props, photos, videos and observations of real animals, identify body parts and bodily processes; compare characteristics of animals to other animals and to humans.
- Provide material for children to experiment with growing plants (e.g., water/no water, light/no light, soil/no soil.
- Guide the children in making observations, predictions about the plants and graphs the plants' growth. Invite

	them to document their predictions and observations. • Invite children to choose a tree in the school yard beginning in the fall and observe it daily, record observations, photograph and make pictures throughout the year to document changes. • Provide opportunities for children to taste different flavors and consistencies and make comparisons. • Provide recordings of environmental sounds for children to identify; let children record their own sounds for others to identify. • Provide children with opportunities to grow and prepare healthful foods to reflect sound nutrition practices. • Provide actual comparisons of real and pretend, such as having the children plant bean seeds and as the plants grow compare with the bean growth in *Jack and the Bean Stalk.* • Help children develop a rubric for real and not real that they can use when reading stories. • Provide books, pictures, videos, etc., to explore animals and insects that move at night and day. • Take children on a walk outside with an old sock over one shoe then "plant" the sock (moisten sock in a tray) to predict, observe and record what happens. • Provide opportunities for children to explore camouflage (e.g., mammals, reptiles, insects, plants). • Have children bring in family photos to make comparisons of characteristics among family members and children. • Provide opportunities to compare similarities/differences with young and adult animals (e.g., frogs/tadpoles, caterpillars/butterflies, kittens/cats). • Provide opportunities to observe, compare and chart physical differences of people (eye colors, hand sizes, heights, etc.), animals (number of legs, body coverings), and plants (colors, heights, types of leaves). • Explicitly teach vocabulary, phrases, and model asking and answering questions for English language learners

	for all concept areas of exploration, so they can be actively engaged in the whole learning process, not just the hands on and observation portions. Extend vocabulary beyond the "moment" for re-enforcement. Words common to native English speakers are not necessarily in the language "bank" of English language learners.

Support for Differentiation

1. Accept children's approximations and attempts and elaborate/expand on these as appropriate.

2. Scaffold each learner in his zone of proximal development.

3. Use assistive technology when appropriate. Assistive technology is technology used by individuals with disabilities in order to perform functions that might otherwise be difficult or impossible. For more information on specific strategies visit: http://www.newton.k12.ks.us/at/examples.htm).

4. Resources based on the *Universal Design for Learning* principles are available at www.cast.org.

Support for English Language Learners
- Use multimedia such as videos, pictures and concrete objects to create connections with vocabulary words.
- Use gestures and body language.
- Speak slowly and enunciate clearly. Do not raise your voice.
- Repeat information and review. If a child does not understand, try rephrasing in short sentences and simpler syntax.
- Try to avoid idioms and slang words.
- Try to anticipate words that might be unfamiliar and give explicit meaning to them.
- Make use of the excellent language learning that occurs among children by supporting play and small-group activities.
- Show children how much you enjoy them and appreciate their efforts to learn a new language.
Adapted from Cecil, N.L. (1999) *Striking a balance: Positive practices for early literacy*. Scottsdale, AZ: Holcomb Hathaway.

Resources:
Preschool English Learners: Principles and Practices to Promote Language, Literacy and Learning. California Department of Education. http://www.cde.ca.gov/sp/cd/re/documents/psenglearnersed2.pdf.

Guidelines for Addressing the Needs of Preschool English Language Learners. Ohio Department of Education, Lau Resource Center. http://education.ohio.gov/getattachment/Topics/Special-Education/Limited-English-Proficiency-(1)/About-the-Lau-Resource-Center/Guidelines-for-Addressing-the-Needs-of-Preschool-English-Language-Learners-(1).pdf.aspx.

Principles of Second Language Development. Ohio Department of Education, Lau Resource Center. http://education.ohio.gov/Topics/Other-Resources/Limited-English-Proficiency/Research/Principles-of-Second-Language-Development-in-Teach#.Ukm8lvkzFC8.gmail.

McGlothlin, Barry (1995). *Fostering second language development in young children: Principles and practices.* http://www.escholarship.org/uc/item/23s607sr#page-1.

Espinosa, L. (2008). Challenging common myths about young English language learners. The Foundation for Child Development. http://fcd-us.org/sites/default/files/MythsOfTeachingELLsEspinosa.pdf.

Additional Resources and Glossary for Cognition

Strand: Cognitive Skills Topic: *Memory*

Print Resources

Bauer, P. J., Evren Güler, O., Starr, R. M., & Pathman, T. (2011). Equal learning does not result in equal remembering: The importance of post-encoding processes. *Infancy*, *16*(6), 557-586.

Fitzpatrick, C., & Pagani, L. S. (2012). Toddler working memory skills predict kindergarten school readiness. *Intelligence*, *40*(2), 205-212.

Websites

Early Experiences & Executive Function

Building the Brain's "Air Traffic Control" System: How Early Experiences Shape the Development of Executive Function, Working Paper #11. Center on the Developing Child, Harvard University

Executive Function

In Brief: Executive Function: Skills for Life and Learning, Center on the Developing Child, Harvard University (video and PDF)

Working Memory

What is Working Memory and Why Does It Matter? Annie Stuart

Making the connection

Infants/Toddlers/Activities: Making the connection, Early Childhood Today

Memory Development

Some Parts of Memory Still Developing Deep into Childhood, Vladimir Sloutsky, PhD, OSU Research and Innovations Communications

Strand: Cognitive Skills Topic: *Symbolic Thought*

Print Resources

Copple, C. Ed. (2012). Growing minds: Building strong cognitive foundations in early childhood. Washington, DC: NAEYC.

Namy, L. L. (2001). What's in a name when it isn't a word? 17-month-olds' mapping of nonverbal symbols to object categories. *Infancy*, *2*(1), 73-86.

Salmon, A. K. (2010). Tools to enhance young children's thinking. *Young Children*, *65*(5), 26-31.

Zan, B., & Geiken, R. (2010). Ramps and pathways. *Journal of Young Children*, *65*, 12-17.

Websites

Kids Health

What is My Infant Learning? Kids Health (video)

Helping Young Children Play

Helping Babies Play, Janet Sawyers & Cosby S. Rogers, NAEYC Beyond the Journal

[Cognitive Development in Preschool](#) *Cognitive Development in Preschool*, Carol Seefeldt and B.A. Wasik (2010) Pearson
Strand: Cognitive Skills **Topic: *Reasoning and Problem Solving***
Print Resources Bodrova, E. & Leong, D. (2006). Tools of the mind: The Vygotskian approach to early childhood education, 2nd Ed. Upper Saddle River, NJ: Pearson. Gloeckler, L., & Cassell, J. (2012). Teacher practices with toddlers during social problem solving opportunities. *Early Childhood Education Journal*, *40*(4), 251-257. Joh, A. S., Jaswal, V. K., & Keen, R. (2011). Imagining a way out of the gravity bias: Preschoolers can visualize the solution to a spatial problem. *Child development*, *82*(3), 744-750. Keen, R. (2011). The development of problem solving in young children: A critical cognitive skill. *Annual review of psychology*, *62*, 1-21. Segatti, L., Brown-DuPaul, J. & Keyes, T. Using everyday materials to promote problem solving in toddlers. *Young Children*, 58(5) 12-18 **Websites** [Supporting Problem Solving](#) *Building Problem-Solving Skills in Toddlers and Preschoolers*, Sara Chapman, MA. Ability Path.org [Toddlers become problem solvers](#) *Early Years are Learning Years: Helping Toddlers become Problem Solvers*, NAEYC [Support Children in Problem Solving](#) *How You Can Help Children Solve Problems*, Ellen Booth Church, Scholastic [Play and Cognition](#) *The Role of Pretend Play in Children's Cognitive Development*, Doris Bergen, Miami University

Glossary

Long-term memory: Refers to the continuing storage of information; the phase of the memory process considered the permanent storehouse of retained information (This information is largely outside of our awareness, and called into *working memory* for use when needed. Some of this information is easy to recall, while other memories are much more difficult to access.)

Reasoning: The use of logical thinking to make sense of a situation or idea (Reasoning is a natural part of childhood. Having the ability to reason and solve problems is crucial to solve daily difficulties. When engaged in activities that increase their symbolic thought, young children are increasing their abilities in reasoning.)

Role-play: To assume the attitudes, actions and discourse of (another), especially in a make-believe situation in an effort to understand a differing point of view or social interaction

Short-term memory: Information we are currently aware of, or thinking about, also known as primary or active memory (The information that is found in short term memory comes from paying attention to sensory memories. Studies have suggested that short-term memory connects to literacy, reading achievement, math ability and math achievement (Bull, 2008; Florit, et al., 2009).)

Working memory: Temporary retention of information that was just experienced, but no longer exists in the external environment, or just retrieved from long-term memory (Working memory enables us to keep several pieces of information active while we try to do something with them. A worktable, a place to gather and see the information with which you need to work, may describe a working memory.)

Reference:

Bull, R., Espy, K. A., & Wiebe, S. A. (2008). Short-term memory, working memory, and executive functioning in preschoolers: Longitudinal predictors of mathematical achievement at age 7 years. *Developmental neuropsychology*, *33*(3), 205-228.

*This glossary was developed by the Center for Family Studies, West Ed. for Early Childhood Ohio Professional Development Related to Approaches toward Learning.

Additional Resources and Glossary for Mathematics

Strand: Number Sense
Topic: *Number Sense and Counting*
Print Resources Greenberg, J. (2012). *More, All Gone, Empty, Full: Math Talk with Infants and Toddlers—Every Day, in Every Way*. Spotlight on Young Children: Exploring Math. Washington, DC: NAEYC. NAEYC & NCTM. (2003). *Learning Paths and Teaching Strategies in Early Mathematics*. Spotlight on Young Children: Math, 29-31. Washington, DC: NAEYC. **Websites** *Math Talk* *Math Talk with Infants and Toddlers, NAEYC: This site describes ways to engage infants and toddlers in talking about math.* *Developing Early Math Skills* *Developing Early Math Skills, Zero to Three: This site provides information on ways to develop early math skills.* *NAEYC Position Paper* *Early Childhood Mathematics: Promoting Good Beginnings, NAEYC Position Paper (2002)* *Early Math Experiences* *Engaging Children in Early Mathematical Experiences, CPIN* *Dot Card and Ten Frame Activities* *Dot Card and Ten Frame Activities, Winnipeg School Division* *Math Begins in Preschool* *Math Begins in Preschool: Talking the Language of Math, Sally Moomaw, Ed.D.* *Video-"Who Has More?"* *"Who Has More? A Game to Practice Subitizing (video)*
Strand: Number Relationships and Operations
Topic: Number Relationships
Websites Add with Me *Add with Me!* Designed Instruction (2004): Resources that connect manipulatives with number activities.
Strand: Algebra
Topic: *Group and Categorize*
Print Resources Taylor-Cox, J. (2003). *Algebra in the early years? Yes!* Spotlight on Young Children: Math. 7-13. Washington, DC: NAEYC. **Websites** Math at Play *Math at Play*, Madison Metropolitan School District: Resources for use in groups or categorizing activities.

Strand: Algebra **Topic: *Patterning***
Websites **Mother Goose** Mother Goose: Activities that include songs and rhymes *Rhythm Instrument Activities* *Rhythm Instrument Activities for Toddlers,* Abigail Flesch Conners *Making Instruments* *Movement and Music Activities for Toddlers:* Patterns Patterns: What Does Algebra in the Early Years Look Like?
Strand: Measurement and Data **Topic: *Describe and Compare Measureable Attributes***
Print Resources Castagnetti, M. & Vecchi, V. (1997). Shoe and meter. Reggio Emilia, Italy: Reggio Children. **Websites** *Measurement* *Measure for Measure: Celebrating a Young Learner at Work, Mark Condon, Ph.D. and Jean Anne Clyde, Ph.D.* *Measurement Vocabulary* *Measurement Vocabulary* Manipulatives and Measurement and Measurement *Explore, Discover, Learn…. Kindergarten-Lessons.com* **NOTE:** While these websites contains some good teaching tips for young learners, some are more appropriate for kindergarten-age children, and some (like math worksheets) are not appropriate at all. Use with caution. Early Math Experiences *Engaging Children in Early Mathematical Experience:* This resource from the California Professional Instructional Network. See pgs. 28-34 for resources on measurement
Strand: Measurement and Data **Topic: *Data Analysis***
Websites Graphs *Children Use Graphs to Build Mathematical Reasoning*, Mark Larson & David Whitin Spatial relations *Growing My Knowledge: Spatial Relations, Florida Department of Education, Office of Early Learning* *Music, Movement and Learning* *The Music, Movement and Learning Connection*: Hap Palmer discusses the benefits of music and movement as it relates to learning concepts.

Strand: Measurement and Data **Topic:** *Identify and Describe Shapes*
Websites The Earliest Geometry *The Earliest Geometry,* Doug Clements & Julie Sarama
Strand: Measurement and Data **Topic:** *Analyze, Compare and Create Shapes*
Websites Engaging Children in Mathematical Experiences *Engaging Children in Early Mathematical Experience:* This resource from the California Professional Instructional Network. See pgs. 35-46 for resources on geometry.

Glossary

Cardinal Numbers (Cardinality): A cardinal number tells "how many." Cardinal numbers are also known as "counting numbers," because they show quantity (e.g., 7 puppies, 3 dolls).

Cluster: Groups of related standards within each math domain (e.g., *Know number names and the count sequence* within Counting and Cardinality.).

Discipline: An organized branch of knowledge within a larger field of study (e.g., *Economics* within the Social Studies or *Life Science* with the Natural Sciences).

Domain: A content area within mathematics. (e.g., *Counting and Cardinality* or *Geometry*).

Flexible grouping: Children of different ages and ability levels are grouped and re-grouped according to specific learning goals, activities and individual needs. For more information visit   http://www.eduplace.com/science/profdev/articles/valentino.html

Interactive Reading: Carefully planned read-alouds to help children gain new vocabulary and learn new concepts.   The teacher and children talk about a book before, during and after it is read. During these discussions, teachers insert definitions of a few vocabulary words and listen carefully to children's comments and questions so that they can clarify misunderstandings and expand responses.

Modality: Learning modalities are the sensory channels or pathways through which individuals give, receive, and store information (e.g., visual learners, auditory learners, tactile/kinesthetic learners. For more information visit http://web.cortland.edu/andersmd/learning/Modalities.htm

Ordinal Numbers (Ordinality): Ordinal numbers tell the order of things in a set—first, second, third, etc. Ordinal numbers do not show quantity. They only show rank or position, (e.g., first, second third).

Scaffolding: an instructional strategy in which the teacher provides information and assistance that allow children to perform at a higher level than they might be able to do on their own. .   Examples include: providing children hints or prompts; demonstrating the task, and/or the thinking required by "talking out loud" through the process.   Begin practice with easier material and once the child has mastered the concept/skills it is appropriate to move to the next level. If the child is still having difficulties, assess where s/he is making the error in thinking, and begin scaffolding from that point.

Standard Statement: Defines what students should understand and be able to do (also *Content Statement, Standard*).

Strand: The content area – or discipline – within the larger field of study (e.g., *Reading* within ELA; *Geometry* within Mathematics, etc.).

Subitize: the process of recognizing and naming the number of objects in a set without counting.

Task Box: A strategy whereby individual learning activities are presented in a box or tray with visual cues/directions to support children with autism and others requiring visual structure.

Tangram: A puzzle consisting of seven flat shapes, called *tans*, which are put together in different ways to form distinct geometric shapes.

Zone of Proximal Development: The zone of proximal development is the gap between what a learner has already mastered (the actual level of development) and what he or she can achieve when provided with educational support (potential development).

General Resources specific to Mathematics:

Copley, J. (2010). The young child and mathematics, 2nd Edition. Washington, DC: National Association for the Education of Young Children (NAEYC).

Moomaw, S. & Hieronymus, B. (1995). More than counting: Whole math activities for preschool and kindergarten. St. Paul, MN: Redleaf Press.

Moomaw, S. & Hieronymus, B. (2002). Much more than counting: More whole math activities for preschool and kindergarten. St. Paul, MN: Redleaf Press.

National Research Council (2002). Helping children learn mathematics. Washington, DC: National Academy Press.

National Research Council. (2009). Mathematics learning in early childhood: Paths toward excellence and equity. Washington, DC: National Academy Press.

NAEYC/NCTM Joint Position Statement: Early Childhood Mathematics - Promoting Good Beginnings.
http://www.naeyc.org/files/naeyc/file/positions/psmath.pdf

Ballweg, J. (2007). Conversations that nurture mathematical thinking. MMSD
http://www.mathatplay.org/resources/pdfhandout/eng/Conversations_Nurture_Mathematical_Thinking.pdf

Math Related Children's Books, NAEYC. http://www.naeyc.org/files/tyc/file/MathbookslistSchickedanzexcerpt.pdf

Hap Palmer http://www.happalmer.com/Index.html

Materials to Support Mathematical Thinking and Skill Development

Infant/Toddler	Preschool
Strand: Number Sense Materials with visual patterns (e.g., toys in bright colors and black-and-white, pillows/upholstery/curtains) Materials in a variety of sizes, shapes, colors, textures Multiples of toys, puppets and other materials Duplicates of toys and materials Discrete items that can be easily counted (NOTE: Make sure they are sturdy and of a size that does not present a choking hazard.) Paired items to create one-to-one correspondence (e.g., pegs and pegboards, socks, egg cartons and eggs, etc.)	**Strand: Number Sense** Printed items containing numbers and mathematical symbols (e.g., signs, labels, brochures, charts and graphs) Collections of small natural and found items (e.g., lids, keys, shells, etc.). Short and Long-path and other board games using number cubes, dominoes or patterned counting Number/picture cards Flannel board/flannel board forms Short and Long-path and other board games using number cubes, dominoes or patterned counting
Strand: Algebra Dining items (e.g., plates, forks, spoons, napkins) Vehicles, animals, plastic fruit and vegetables Containers for placing items Photos of family members Songs with rhymes and movements (e.g., Patty-cake, Peek-a-Boo, etc.) Interactive board books	**Strand: Algebra** Pairs of objects (socks, mittens, toys, blocks, etc.) Blocks, keys, colored bottle caps, cups (Make sure all materials are sturdy and of a size that does not present a choking hazard.) Sorting trays, egg cartons, ice cube trays Materials to copy and create series and patterns (e.g., beads, sticks, small blocks, pegs and pegboards, writing and collage materials)

Space for large motor patterns and mat/mattress for jumping, bouncing, rolling Repetitious, rhythmic songs, chants and poems Rhythm sticks, drums or other simple rhythm instruments "Follow the Leader" games	Original artwork and reproductions featuring patterns (e.g.,, weavings, baskets) Rhythm instruments Shells and other patterned items from nature Computer programs that allow children to recognize and create series and patterns
Strand: Measurement and Data Materials with visual patterns (e.g., toys in bright colors and black-and-white, pillows/upholstery/curtains) Materials in a variety of sizes, shapes, colors, textures (NOTE: Ensure materials are safe for mouthing and easily cleaned Sand and/or water scoops, buckets, shovels, cups etc. for dumping and pouring Nesting cups, stacking rings, measuring spoons/bowls and other materials of graduated sizes Riding toys Everyday things to fit together and take apart (e.g., puzzles, boxes with lids, clothing with different fasteners) Shape sorter Assorted pattern blocks, sets of basic two-dimensional shapes Duplos® and other age-appropriate fit-together toys Shape sorters, nesting cups, stacking rings Vehicles, animals to demonstrate movement Space for large muscle movements (e.g., stepping, marching, dancing)	**Strand: Measurement and Data** Cuisenaire® Rods Counting bears in colors and sizes Balance scale Unconventional measuring tools (e.g., yarn, ribbon, blocks, cubes, paper clips, shoes) Conventional measuring tools (e.g., tape measures, scales, grid paper, checkered table cloths, rulers, measuring spoons, graduated cylinders, string) Muffin tin, plastic tubs, containers of all shapes and sizes. Toy cars, plastic counting bears Tools for recording data (e.g., chipboards, paper, pencils, crayons, markers) Materials for diagramming or graphing data (e.g., newsprint pads and easels, graph paper with large grids, poster board) Small objects to represent counted quantities (e.g., buttons, acorns, pebbles, beans, pennies) Boxes, baggies for sorting into groups Box, table etc. large enough for children to demonstrate position words using their own bodies Vehicles, animals, etc. Tangrams, pattern blocks, parquetry blocks, geo-boards. Unit, architectural and 3-dimensional block sets. Materials to create two-dimensional shapes (e.g., string, pipe cleaners, yarn, paper/scissors Moldable materials to create three-dimensional shapes (e.g., clay, dough, sand, beeswax, toothpicks) Blueprints, photographs, graphic drawings and other authentic architectural models in block, art, and manipulative centers Multiple forms of art media for drawing, painting, sculpting, constructing

Children's Literature Selections for Mathematics

Number Sense
Pat the Bunny, Dorothy Kunhardt
Baby Touch and Feel: Animals, DK
The Going-to-Bed Book, Sandra Boynton
Spot Goes to the Farm, Eric Hill
Peek-a-Boo You, Roberta Grobel Intrater
Where is Baby's Belly Button?, Karen Katz
Dear Zoo: A Lift the Flap Book, Rod Campbell
Big Fat Hen, Keith Baker
Over in the Meadow, Ezra Jack Keats
One Duck Stuck, Phyllis Root
Ten Red Apples, Pat Hutchins
Count!, Denise Fleming
Moja Means One, Muriel Feelings
My Signing Book of Numbers, Patricia Bellan Gillen
Fish Eyes: A Book You Can Count On, Lois Ehlert
Olivia Counts, Ian Falconer
Henry the Fourth, Stuart J. Murphy
Just Enough Carrots, Stuart J. Murphy
The Doorbell Rang, Pat Hutchins
More, Fewer, Less, Tana Hoban
More Bugs? Less Bugs?, Donald L. Curry

Group and Categorize
Who's Peeking, Charles Reasoner
Baby's Zoo, Neil Ricklen
Touch and Feel Animal Colors, DK
Baby Talk, Anne Miranda
White on Black, Tana Hoban
A Pair of Socks, Stuart Murphy
Hats, Hats, Hats, Ann Morris
Shoes, Shoes, Shoes, Ann Morris
Is it Red? Is it Yellow? Is it Blue?, Tana Hoban
Sorting All Sorts of Socks, Betsy Franco
Tools, Ann Morris & Ken Heyman

Number Relationships
Black on White, Tana Hoban
Black & White, Tana Hoban
Look, Look! Peter Linenthal
Ten Black Dots, Donald Crews
The Very Hungry Caterpillar, Eric Carle
Let's Count, Tana Hoban
Five Silly Turkeys, Salina Yoon
1-2-3 To the Zoo: A Counting Book, Eric Carle
Five Little Monkeys Sitting in a Tree, Eileen Christelow
Ten Terrible Dinosaurs, Paul Stickland
The Hershey's Kisses Subtraction Book, Jerry Pallotta
Feast for Ten, Cathryn Falwell
The Napping House, Audrey Wood
Ten in the Bed, Penny Dale
Monster Musical Chairs, Stuart J. Murphy
Pete the Cat and His Four Groovy Buttons, Eric Litwin
Can Cockatoos Count by Twos? Hap Palmer

Patterning
Peek-a-Who?, Nina Laden
Open the Barn Door, Find a Cow, Christopher Santoro
From Head to Toe, Eric Carle
Clap Your Hands, Lorinda Bryan Cauley
Move!, Steve Jenkins
Ten Little Rabbits, Virginia Grossman
Max Found Two Sticks, Brian Pinkney
Close, Closer, Closest, Shelley Rotner
Nature's Paintbrush, Susan Stockdale

Describe and Compare Measureable Attributes
Is it Larger? Is It Smaller? Tana Hoban
Curious George Bigger and Smaller, H. A. Rey
Goldilocks and the Three Bears
Who Sank the Boat? Pamela Allen
Inch by Inch, Leo Leonni

Data Analysis
Red is Best, Kathy Stinson
Teamwork, Ann Morris
Each Orange had 8 Slices, Paul Giganti
What Do You Do with a Tail Like This? Steve Jenkins
Clap Your Hands, Lorinda Bryan Cauley
Wiggle, Doreen Cronin
Freight Train, Donald Crews
Flying, Donald Crews
Giraffes Can't Dance, Giles Andreae
Going on a Bear Hunt, Michael Rosen & Helen Oxenbury
Inside, Outside, Upside Down, Stan & Jan Berenstain
Each Peach, Pear, Plum, Janet and Allen Ahlberg
Rosie's Walk, Pat Hutchins
"Sammy" *Getting to Know Myself*, Hap Palmer
"Put Your Hands Up in the Air," *Learning Basic Skills Through Music Vol. I*, Hap Palmer
"Under the Stick," *Learning Basic Skills Through Music*

A Million Fish…More or Less, Patricia McKissack
Pigs in the Pantry: Fun with Math and Cooking, Amy Axelrod
The Button Box, Margarette Reid
Just a Little Bit, Ann Tompert
Math! Math! Math! Audio CD by Ron Brown

Identify and Describe Shapes
Shapes, Shapes, Shapes, Tana Hoban
Changes, Changes, Pat Hutchins
Mouse Shapes, Ellen Stoll Walsh
Cubes, Cones, Cylinders, & Spheres, Tana Hoban
Color Zoo, Lois Ehlert
"Triangle, Circle and Square", *Learning Basic Skills Through Music Vol. II*, Hap Palmer

Analyze, Compare and Create Shapes
Twizzlers Shapes and Patterns, Jerry Pallotta
Architecture: Shapes, Michael Crosbie & Steve Rosenthal

Additional Resources and Glossary for Social Studies

Strand: Self **Topic:** *Social Identity*
Websites **Identity and Self-Esteem** *Early Childhood Emotional and Social Development: Identity and Self-Esteem*, Angela Oswalt, MSW **Love, Learning and Routines** Love, Learning and Routines, Zero to Three
Strand: History **Topic:** *Historical Thinking and Skills*
Print Resources National Association for the Education of Young Children, (2005). Exploring Social Studies through Children's Books. *Young Children,* 60(5), 1-5. **Websites** Calendar Time Beneke, S.J., Ostrosky, M.M. & Katz, L.G. (2009). *Calendar Time for Young Children: Good Intentions Gone Awry*, Young Children. 63(3), 12-16 Routines *Helping Children Understand Routines and Classroom Schedules*, CSEFEL Routines and Transitions Routines and Routine Changes
Strand: History **Topic:** *Heritage*
Print Resources Sparks, L.D., Edwards, J.O. (2010). Anti-bias education for young children and ourselves. Washington, DC: National Association for the Education of Young Children (NAEYC). McCracken-Brown, J. (1990). Helping Children Love Themselves and Others: A Professional Handbook for Family Day Care. Washington, DC: The Children's Foundation. **Websites** Diversity Diversity in Early Childhood Programs, Francis Wardle Language and Culture Many Languages, Many Cultures, Scholastic

Strand: Geography Topic: *Spatial Thinking and Skills*
Print Resources Seefeldt, C. (2001). <u>Social studies for the preschool/primary child</u>. Upper Saddle River, NJ: Merrill Prentice Hall. Stevens, R., & Hatfield, M. (2003). *Map adventures: Introducing geography concepts.* <u>*Social Studies and the Young Learner,*</u> 16(2), 1-4. **Websites** Geography Early Childhood: Where Learning Begins - Geography. Maps Learning About Maps, Scholastic 3-D Village Children cooperatively build a village in their classroom, Scholastic My Community Book Children make a book about favorite places in their community
Strand: Geography Topic: *Human Systems*
Print Resources Espinosa, L. (2010). <u>Getting it right for young children from diverse backgrounds: Applying research to improve practice</u>. Washington, DC: NAEYC **Websites** *NAEYC Position Paper* *Responding to Cultural and Linguistic Diversity: Recommendations for Effective Early Childhood Education* (NAEYC 1995) NAEYC Position Paper Update *Where We Stand: On Responding to Cultural and Linguistic Diversity* (NAEYC 2009) Teaching Diversity *A Place to Begin*, Janet Gonzalez-Mena, Dora Pulido-Tobiassen (Scholastic)
Strand: Government Topic: *Civic Participation and Skills*
Print Resources Gartrell, D. (2012). <u>Education in a civil society: How guidance teaches young children democratic life skills</u>. Washington, DC: NAEYC Peterson, R. (1992). <u>Life in a crowded place: Making a learning community</u>. Portsmouth, NH: Heinemann. **Websites** The Mail Project *The Mail Project*: A Let's Learn Inquiry Project, Ohio Resource Center/Resources for Early Childhood

Your Vote Counts
Your Vote Counts: A Let's Learn Inquiry Project, Ohio Resource Center/Resources for Early Childhood
Classroom Community
Creating Caring Class room Communities Through Reader's Theater, Mary Barbara Trube.

Strand: Government
Topic: *Rules and Laws*

Print Resources
Epstein, A. (2009). *Creating and following rules* in <u>Me, you, us: Social-emotional learning in preschool</u>. Pgs. 125-133. Ypsilanti, MI: High Scope Press

Websites
Rules and Routines
Ages and Stages: Helping Children Adjust to Rules & Routines, Carla Poole, Susan A. Miller, EdD, and Ellen Booth Church
Daily Routines
It's the Little Things: Daily Routines
Rules, Routines and Schedules
Classroom Management – Rules, Routines, and Schedules, TATS

Strand: Economics
Topic: *Scarcity*

Print Resources
 Seefleldt, C. (2001).   *Economics* in <u>Social Studies for the Preschool/Primary Child</u> 6th Ed. pgs. 277-295.

Websites
Economics for Preschoolers
Lessons on Economics for Preschool Children, Karen Bietz
Financial Literacy
Preschool Financial Literacy Education: Lesson Models and Evaluation Framework, Charles Kalish, Karen Holden, Joyce Hemphill, Rory Anne Raasch, and Farha Tahir.

Strand: Economics
Topic: *Production and Consumption*

Print Resources
Seefleldt, C. & Galper, A. (2006). *Wants and needs: Beginning economic concepts* in <u>Active experiences for active children: Social Studies</u> 2nd Ed. pgs. 136-149. Upper Saddle River, NJ: Pearson.
Koralek, D., & Mindes, G. (Eds.) (2006). <u>*Spotlight on young children and social studies*</u>. Washington, DC: NAEYC.

Websites
The Bread-Making Project
The Bread-Making Project - A Let's Learn Inquiry Project

Glossary*

Asset: Something of value.

Autonomy: Personal independence and capacity to make moral decisions and act on them. (Encarta.com/dictionary).

Bartering: The act of obtaining goods and services by negotiating with other goods and services.

Citizenship: Demonstration that one is a citizen, that is owing allegiance to a government and is entitled to its protection; membership in a community.

Community: 1) An interacting population of individuals in a common location; 2) A group of people sharing common interests, history or characteristics.

Culture: The shared actions, beliefs, language, knowledge and attitudes of a group as reflected in their ways of engaging in everyday life.

Economics: A social science dealing with the production, distribution and consumption of goods and services.

Economic Exchange: The process of giving up one thing for another that benefits both parties; also known as trade.

Economic Value: The quantity of labor, goods or money that people are generally willing to give in exchange for something.

Exchange: To give up (something) for something else; part with or some equivalent; change for another.

Geography: The natural features of a region; a science that deals with the natural features of the earth and the climate, products and inhabitants.

History: A branch of knowledge that records and explains past events.

Government: The organization or agency through which a political unit is governed (controlled, regulated, restrained).

Natural Resources: Something that is found in nature and is necessary or useful to humans, such as a forest, mineral deposits, or fresh water.

Oral History: Learning about history through oral narratives; often a story about the past from family or community members with a beginning, middle and end, and a setting, characters, problem (or problems) and resolution.

Peace: A state of accord or harmony between persons; agreement to end hostilities.

Resource: A source of supply or support; a natural source of wealth or revenue; a source of expertise or information.

Scarcity: The concept that there is always a conflict between never-ending wants and limited resources.

Socioeconomic Status: The economic and social conditions under which people live.

Stewardship: The careful and responsible management of something entrusted to one's care.

Tolerance: Respect, acceptance and appreciation of the rich diversity of our world's cultures, our forms of expression and ways of being human. (http://www.tolerance.org/about/tolerance.html).

Value: Relative worth, usefulness or importance.

Voting: The act of making a choice about something, this can be done either informally or formally.

*Glossary terms adapted from Early Learning Content Standards professional development modules in Social Studies developed for the Ohio Department of Education, Office of Early Learning and School Readiness by ecQnet/The Center for Special Needs Populations of The Ohio State University

Children's Literature Selections for Social Studies

Social Identity
The Going to Bed Book, Sandra Boynton
Where is Baby's Belly Button?, Karen Katz
The Skin You Live In, Michael Tyler
The Family Book, Todd Parr
I Like Myself, Karen Beaumont
Marvelous Me: Inside and Out, Lisa Bullard
Guess How Much I Love You, Sam McBratney.
The Runaway Bunny, Margaret Wise Brown
What Mommies Do Best/What Daddies Do Best, Laura Numeroff.
The Goodbye Book, Judith Viorst.
The Invisible String, Patrice Karst.
"More More, More," Said the Baby, Vera B. Williams
Sparrow, Dorinda S. Williams.

Geography
Rosie's Walk, Pat Hutchins
Me on the Map, Joan Sweeney
Maps and Globes, Jack Knowlton
Follow That Map!: A First Book of Mapping, Scot Ritchie
Who's in a Family?, Robert Skutch
It's Okay to Be Different, Todd Parr
All Families are Special, Norma Simon
Families, Ann Morris
And Tango Makes Three, Justin Richardson
The Hello, Goodbye Window, Norton Juster

History
My Day, Kim Mitzo
Llama Llama Wakey Wake, Anna Dewdney
Time for Bed, Mem Fox
Curious George Time for School. H.A. Rey
Sweet Clara and the Freedom Quilt, Deborah Hopkinson
A is for Africa, I. Onyefulu
Suki's Kimono, Chieri Uega

Government
The Day Gogo Went to Vote, E.B. Sisulu
Stone Soup (many versions)
Always Room for One More, S Leodhas
The Greatest Table, Michael Rosen
Knuffle Bunny Too, Mo Willems
David Goes to School, David Shannon
If You Take a Mouse to School, Laura Numeroff

Economics
Bread Comes to Life, George. Levenson
The Vegetables We Eat, Gail Gibbons
Market Day, Lois Elhert
Yetsa's Sweater, Sylvia Olson
The Tortilla Factory, Gary Paulsen
Chicken Sunday, Patricia Polacco
Those Shoes, Maribeth Boelts
Sam and the Lucky Money, K. Chinn
Mama Panya's Pancakes, M. Chamberlin & R. Chamberlin
The Doorbell Rang, Pat Hutchins
Chubbo's Pool, Betsy Lewin
Alexander Who Used to Be Rich Last Sunday, Judith Viorst
Jelly Beans for Sale, Bruce McMillan
Pasta Factory, Hana McHotka

Additional Resources and Glossary for Science

Strand: Science Inquiry and Application **Topic: *Inquiry***
Print Resources Helm, J.H. & Katz, L. (2010). <u>Young investigators: The project approach in the early years</u>, 2nd Ed. New York: Teachers College Press. **Websites** Science and Young Children *Introducing Science to Young Children*, Kimberlee Whaley Scientific Thinking *Promoting the Development of Scientific Thinking*, Ruth Wilson, PhD Scientific Inquiry Dyasi, H. (2000). *What children gain by learning through inquiry*. Foundations, 2, 9–13. Inquiry *Turning Curiosity into Scientific Inquiry*, Jennifer Gonya, PhD.
Strand: Science Inquiry and Application **Topic: *Cause and Effect***
Websites Cause and Effect A Child's World of Cause and Effect, G.A. Davis & J.D. Keller (2010).
Strand: Earth and Space Science **Topic: *Explorations of the Natural World***
Print Resources Worth, K. (2003). <u>Worms, shadows and whirlpools: Science in the early childhood classroom</u>. Portsmouth, NH: Heinemann. Moomaw, S. & Hieronymus, B. (1997). <u>More than magnets: Exploring the wonders of science in preschool and kindergarten</u>. St. Paul, MN: Redleaf Press. **Websites** Earth and Space Science A collection of articles and activities to support science learning from the Ohio Resource Center/Resources for Early Childhood. "Look All Around" Children explore natural resources and their uses in the environment. (ODE) "Day and Night" Children explore activities that occur during the day and at night.

"How Windy Is It?"
An exploration of wind and making things move using the power of air.

Strand: Physical Science **Topic: *Explorations of Matter and Energy***
Print Resources DeVries, R. & Sales, C. (2011). <u>Ramps and pathways: A constructivist approach to physics with young children</u>. Washington, DC: NAEYC. **Websites** Physical Science A Teacher's Guide for science education in the early years developed by the Center for Informal Science Education at the Florida Museum of Natural History and the University of Florida. Kitchen Science A Teacher's Guide to science related to cooking - changes in matter and energy "The Instrument Project" A preschool exploration of instruments, sounds, and music.
Strand: Life Science **Topic: *Explorations of Living Things***
Print Resources Shaffer, LF, Hall, E., Lynch, M. (2013). *Toddlers' scientific explorations: Encounters with insects*. <u>Spotlight on Young Children: Exploring Science</u>. Washington, DC: NAEYC. Hachey, AC & Butler, D. (2013). *Science education for preschoolers through gardening and nature-based play*. <u>Spotlight on Young Children: Exploring Science</u>. Washington, DC: NAEYC. **Websites** Life Science A collection of articles and activity plans exploring life science from the Ohio Resource Center/Resources for Early Childhood.

Glossary*

Adult: The developmental stage where the organism is grown or mature and is capable of reproducing.

Altitude: The angle between the Earth's surface (horizon) and the object in the sky like the sun or moon.

Amplitude: The loudness of a sound; the measure of the amount of energy in a sound wave.

Attract (pull): A non-contact force that causes to objects to move toward one another (magnets "attract" and "repel").

Cardinal Directions: The four cardinal points on the horizon - north, south, east and west.

Clay: Type of soil with very fine particles (smallest grain size). When clay is wet is behaves (feels like and squishes) like Play-Doh or modeling clay. When clay is dry or fired, it is hard like a brick.

Data: Measurements, objects, images, or descriptions that are gathered through careful observation.

Day: The period of light between one night and the next; the period of light between dawn and dusk.

Deposition: The process of putting down rock pieces or soil into a new area (deposit). When the products of erosion stop moving and gravity causes them to fall down to the ground or bottom of a stream or ocean.

Dirt: Dust or grime.

Egg: The initial developmental stage where the organism is developing inside a casing.

Erosion: The process of putting pieces of rock or soil into motion.

Evaporation: The process that occurs with a liquid turns into a gas or vapor.

Exoskeleton: The insect's skin. Usually stiff to provide support and does not grow with the insect.

Ferromagnetic: Materials such as iron or nickel that interact with a magnet or that can be magnetized to become a magnet.

Frequency: How many times a wave (e.g. sound) passes given point per unit of time. The higher the frequency of a sound wave the higher the pitch, the lower the frequency of a sound wave, the lower the pitch.

Germination: The process by which the plant inside a seed begins to grow and become a seedling.

Heredity: The passing on of common traits from one generation to the next.

Hypothesis: An educated guess.

Investigation: Using scientific inquiry to explore and answer questions but does not always involve experimentation with controlling and manipulating variables. Some investigations are descriptive.

Larva: Immature, worm-like stages, usually significantly different in form than adult.

Leaves: Leaves begin forming during growth; leaves produce food for the plant.

Life Span: Transitions from birth to adult to death.

Measure: The dimension, capacity or amount of something marked in multiples of a specific unit.

Metamorphosis: A fundamental change in form and often in habits of an animal accompanying the transformation of a larva into an adult.

Mineral: A naturally occurring, inorganic solid with a definite chemical composition and ordered internal structure.

Molting: The process of shedding exoskeleton or skin.

Motion: An act, process or instance of moving that occurs when a force acts upon an object. Motion can be described and changed in a variety of ways.

Night: The period of dark between dusk and dawn.

Observation: Using the senses with and without tools to gather data for further analysis.

Organism: An individual living thing.

Organization: The tendency of all forms of life to arrange structures, both physical and psychological, into higher order systems or structures for the performance of necessary functions.

Pendulum: A body that swings freely from a fixed point.

Pitch: The highness or lowness of a sound; the result of the frequency of the sound waves.

Prediction Testing: The gathering of data to test the proposed idea about what might happen based on previous observations and experiences.

Prediction: Proposing an idea about what might happen based on previous observations and experiences.

Pupae: The developmental stage between larva and adult when the organism is inactive.

Ramp: A sloped pathway that connects two different levels. A ramp is a simple machine that makes work easier by reducing the amount of force needed to move an object from one level to another.

Refraction: The bending of a ray (as of light) when it passes from one medium into another in which its speed is different.

Repel (push): A non-contact force that causes two objects to move away from one another (magnets "attract" and "repel").

Rise/Set: When an object in the sky appears to move above the horizon (rise) and below the horizon (set).

Rock: Natural material made up of one or more minerals.

Scientific Inquiry: The process that consists of principles and procedures for the systematic pursuit of knowledge involving the formulation of a problem or hypotheses and the collection of data through observation and experimentation.

Season: A division of the year, marked by changes in weather. Some geographic locations have four seasons (spring, summer, fall and winter) while others have two seasons (wet/rainy and dry).

Shadow: Partial darkness in a space from which light rays are cut off.

Soil: Natural body comprised of solids that are non-living (inorganic minerals) and living (organic matter), liquid (water) and gases that occur on the land surface.

Surface Tension: A property of water that results from water molecules being attracted to one another.

Variable: Something that has the potential to affect the outcome of an experiment.

Visible Light Spectrum: The full range of colors that constitute white light. These include the colors of the rainbow - red, orange, yellow, green, blue, indigo and violet. These colors are evident when light is refracted.

Weathering: The process of breaking-down (physical weathering) or dissolving (chemical weathering) rocks.

*Glossary terms adapted from Early Learning Content Standards professional development modules in Science developed for the Ohio Department of Education, Office of Early Learning and School Readiness by ecQnet/The Center for Special Needs Populations of The Ohio State University.

Children's Literature Selections for Science

Earth and Space Science (Exploring the Natural World)
The Moon book, Deborah J. Short
The Magic School Bus Lost in the Solar System, Joanna Cole and Bruce Degen
Hubble's Universe: Greatest Discoveries and Latest Images, Terence Dickinson
Rocks, Fossils and Arrowheads, Laura Evert
Rocks: Hard, Soft, Smooth and Rough, Natalie M. Rosinsky
The Rock Factory: The Story About the Rock Cycle, Jacqui Bailey
The Ocean, DK Books
Oceans: Dolphins, Sharks, Penguins and More, John Rizzo & Sylvia Earle
Let's Read-and-Find-Out Science Series:
- *Clouds*, Anne Rockwell
- *Flash, Crash, Rumble and Roll*, Franklyn M. Branley
- *Feel the Wind*, Dorros
- *What Makes Day and Night*, Franklyn M. Branley
- *Sunshine Makes the Seasons,* Franklyn M. Branley
- *The Moon Seems to Change*, Franklyn M. Bransly

The Great Kapok Tree, Lynne Cherry
Earth Book for Kids: Activities to Help Heal the Environment,

Physical Science (Exploring Matter and Energy)
Little Blue and Little Yellow, Leo Leonni
Mouse Paint, Ellen Walsh
Color Dance, Ann Jonas
Solid, Liquid or Gas?, Faye Robinson
Hot and Cold, Angela Royston
The Popcorn Book, Tomie DePaola

Life Science (Exploring Living Things)
The Kids' Catalogue of Animals and the Earth, Chaya M. Burstein
Every Living Thing, Cynthia Rylant
The Very Hungry Caterpillar, Eric Carle
The Very Busy Spider, Eric Carle
Baby Animals and Moms, Rachael Poole
The Tiny Seed, Eric Carle
Planting a Rainbow, Lois Ehlert
Growing Vegetable Soup, Lois Ehlert

| Linda Schwartz
The Three Rs: Reuse, Reduce, Recycle, Nuria Roca and Rosa M. Curto
The Environment Collection for Kids:
Air, David Palatnik *Earth*, Israel Felzenzwalb & David Palatnik *Plants*, Israel Felzenzwalb & David Palatnik *Water*, David Palatnik & Israel Felzenzwalb | |