# Nevada's Pre-Kindergarten Standards

# GUIDEBOOK FOR TEACHERS


## Science

**April 2009**

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# *SCIENCE*

## Nevada's Pre-Kindergarten Content Standards

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# Science Introduction

Pre-Kindergarten Science is a time of discovery (Bredekamp & Copple, 1997). Science concepts need to be concrete, observable, and within the realm of the child's experience and pre-operational thinking (Piaget & Inholder, 1967). Science concepts are encompassed throughout all the domains in the Pre-Kindergarten Standards. Children use literacy to gain information and language to express their wonder in the world around them while using research to answer questions prompted by their imaginations. Through creative arts, children use a variety of media to share ideas and express understanding (*The Hundred Languages of Children,* Edwards, Dandini and Forman, 1998). Through play, children experiment and test their hypotheses. "… The concepts children gain from their early explorations, questions, observations, and descriptions of their physical world will serve as the foundation on which they will build the abstract and scientific concepts of their physical world (McGraw-Hill, 2003)."

Goals of Pre-Kindergarten Science:

- To enhance children's natural and instinctual observational skills
- To support and guide children's curiosity and their need to experiment
- To encourage exploration and discovery
- To highlight the wonders of the world around them

Pre-Kindergarten children learn science concepts through active play and exploration of their environment. Responsive adults facilitate discovery by inviting questions, asking open-ended questions, encouraging hands-on experiences, and providing opportunities to experiment and observe the world through a variety of media and **realia** (McGraw-Hill, 2003).

The 6 science strands are identified as Physical, Life, Earth and Space, Environment, Nature and History, and Scientific Inquiry. Although appropriate levels of learning can be adopted for each of these strands, the Pre-Kindergarten Standards have been linked with the Kindergarten Standards and are not meant to limit or exclude children's exploration or experiences with science concepts that have not been included in this document (National Science Education Standards, 1996).

Nevada's Pre-kindergarten standards are a joint effort supported by the Nevada Department of Education's Office of Special Education, Elementary and Secondary Education, and School Improvement Programs, as well as the State of Nevada, Department of Human Resources, Welfare Division, Child Care Assistance Department and the Child Care and Development Fund. These agencies have been challenged by the *Good Start, Grow Smart* initiative to work together to develop standards to be used by all early childhood education programs in Nevada as a guide for child outcomes for preschool.

These standards should be understood as what children may know by the end of preschool before entering kindergarten. It is important to understand that if your child does not meet the standards this does not mean they will be ineligible or unsuccessful in kindergarten or beyond. These standards are guides that can be used with all children in any early education setting such as childcare centers, family childcare homes, Head Start, preschools and school district Pre-K programs.

One important point to remember is that all children develop differently. All children, no matter what their level, should be valued and respected. Teachers should understand and use "developmentally appropriate practice" in their interactions with children. This term refers to understanding and respecting a child's individual development and unique characteristics and skills.

The following is a guidebook teachers can use to learn more about Nevada's Pre-K standards and to help with guiding children as they learn science concepts. Teachers are encouraged to be as creative as possible with the children in their classrooms and know that no single technique will work with all children.

***Note to Teachers:*** Each of the following pages contains a Pre-K Science standard. The standards have also been reworded from the original Pre-Kindergarten Content Standards document.

## Physical Science

Understanding the gravitational, electrical, and magnetic influence on the motion of objects.

**Content Standard 1.0**
***(Forces and Motion)***

### *Teacher Activities:*

**Ice Friction**. Materials: Ice cubes, Foil, Large Trays. Freeze water in a variety of containers of different sizes and shapes. Fill to different depths. Cover one tray with smooth aluminum foil. Wrinkle aluminum foil and cover the second tray with a bumpy surface. Ask the children for predictions about what will happen when you slide an ice cube over the two trays. Try sliding ice cubes across the surfaces and observing the differences. Ask the children what kind of surfaces around your classroom would be like the smooth foil and which ones are like the rough foil. Have them compare the bottom of their shoes. Which ones would resist slipping more? The rough surface produces greater friction (the rubbing of one surface against another.) This slows the ice cube.

**Magnetism through Water**: Materials: Iron filings or magnetic sand, large jar, strong magnets, water. (Iron filings may be collected by dragging a strong magnet over dirt.) Place iron filings in the bottom of the jar. You will need enough to cover the bottom of the jar at least an inch deep. Fill the jar with water and put on the top. Provide several magnets of various strengths. Add this to your regular magnet center. Provide time for the children to explore the jar. Ask if the magnets will work through glass (or plastic) and water. Ask what will happen if the magnet is released from the side momentarily. How can they make the filings re-collect on the side of the jar?

**Magnet Painting**: Materials: A shallow cardboard box (shoe box or larger), construction paper, 2 colors of tempera paint, wooden blocks, plastic cups, plastic spoons, magnetic marbles, magnet wand. Cut the paper to fit inside of the box. Elevate the box by placing stacks of wooden blocks under both ends of the box. Submerge magnetic marbles in plastic cups of paint. Use plastic spoons to put two or three marbles into the box. Move the wand underneath the box. Re-submerge marbles as necessary. What happened? The children see that the magnetic field from the wand could pass through a solid object (box).

**Gak**: Materials: 5 tablespoons of Borax, 2 cups of Elmer's Glue, 1 ½ cups of water, and liquid water color (if desired).
Mix the glue and water in a bowl. Add water color if needed. Stir in one cup of warm to hot water with the Borax. Make sure it dissolves completely. After it dissolves, slowly pour the Borax into the glue mixture. Mix with your hands or a wooden spoon. Mix it until it has the consistency of silly putty. Store the Gak in a Ziploc bag. Let the children experiment with the Gak. You can add props or straws and blow bubbles with the mixture. Place some Gak in a strawberry basket and hang from the ceiling over a table or work surface. The children will observe the Gak slowly stretching to the table. Add scissors for children to cut the Gak.

**Seltzer Rockets**: Materials: Alka Seltzer tablets, water, film canister with lid, and a rocket body made from paper.
Preparation: Tape paper rocket body around the film canister, place the rocket inside a clear bin to catch spills and place on a flat surface. Fill the film canister ¾ full with tap water, add ½ tablet of Alka Seltzer and quickly close the lid. It may take 1-2 minutes for the rocket to launch. (Make sure everyone is standing several feet away from the rocket!)

**Ice Floating:** Materials: Large ice shapes, transparent tub, water. Fill the large transparent tub 2/3 full of water. Show the children different sizes and shapes of ice. Tell them you are going to put the ice shapes in a tub of water. Have the children hypothesize what will happen. Will they melt? Will they float or sink? Does the size or shape matter? Place the ice in a large tub of cool water. Notice that the ice floats with about 1/3 of it above water. This is true of icebergs also. Add different temperature water. Again, ask the children for predictions. What happens? Crush some ice. What will happen to it?

**Regular or Diet?:** Materials: A large clear container, water, a can of regular cola and a can of diet cola. Fill the large container ¾ full of water. Ask the children to predict what they think will happen when the cans of soda are placed in the container of water. The artificial sugar in diet cola is heavier than natural sugar and will cause the diet cola to sink. The regular cola will float close to the top.

**Salt Water/Flotation:** Materials: Two glasses, two eggs, spoon, water, salt. Fill both glasses with water. Stir several tablespoons of salt into one of the glasses. Ask the children what will happen when the eggs are cracked into each glass. Will they float or sink? Record the children's predictions. Crack an egg into each glass. Salt helps to support the weight of the egg. The egg floats because the water has more "stuff" in it.

**Read Who Sank the Boat?** By Pamela Allen

### *Teachers may begin to see children:*

- Explore and demonstrate how objects move.
- Investigate how objects react when placed in water.

### *Tips to help children understand the movement of objects or Forces and Motion:*

- *Children may begin to comment on changes in the physical world.*
- *Set up a table with assorted magnets and materials for children to explore and discover.*
- *Provide opportunities for children to experiment with using simple scientific tools (e.g., ramps made from blocks and magnets).*
- *Read fiction and non fiction books that portray the physical world.*
- *Encourage children to predict and examine what will happen next during science experiments.*

**Physical Science**

Understanding that materials have certain properties that depend on the amount of matter present, chemical composition, and structure.

**Content Standard 2.0**
***(Structure and Properties of Matter)***

***Teacher Activities:***

• **Collections**: Collect items from nature to observe and sort at the science center. Include found items such as a variety of pinecones, rocks, seashells, leaves, seeds, pods, nuts, and etc.

• **Magnifying:** Provide magnifying glasses and hand lenses for children to use for observation in the classroom and outside.

• **Simple Experiments:** Give children opportunities to engage in simple experiments that give them time to explore and mix different materials together.

• **Group time activities:** Ask open-ended questions during group time to help to encourage discussion and interest into scientific inquiry. Ask the children questions such as why do magnets stick together? Why does the red car roll faster than the green one? Or why does ice melt faster when the sun shines? Write down their responses and create a chart in the classroom. Ask the children to make predictions. Follow up with hands-on science experiments to make the experience more concrete.

## *Teachers may begin to see children:*

● Sort objects according to observable properties (e.g. by shape size and color).

● Sort objects by their characteristics hard/soft, heavy/light, and sink/float.

● Sort objects and materials by what they are made from (e.g., fabric, wood, glass, plastic, rocks, and metal).

## *Tips to help children understand how matter, chemical composition, and structure influence materials:*

▪ *Provide children with opportunities to experiment with different materials to gain more knowledge about how objects work.*

▪ *Give children many opportunities to have cooking experiences in the classroom.*

**Physical Science**

Understanding that changes in temperature and pressure can alter states of matter. Energy exists in many forms, and one form can change into another.

**Content Standard 3.0**
***(Energy and Matter: Interactions and Forms)***

## *Teacher Activities:*

**Blubber Mittens:** Materials: Two sandwich sized Ziploc bags, a can of Crisco, masking tape, large container, ice cubes, and water. Fill each baggie with Crisco and close tightly. Use the masking tape to tape three sides of the two bags together leaving one end open. Fill the container with cold water and lots of ice cubes. Have a child place one hand into the mitten. Have the child place the hand with the mitten and the bare hand into the water at the same time. Ask how it feels? What do they notice about the mitten? This experiment fits well with a unit on whales.

**Ice and water:** Provide children with many opportunities to experiment and explore with ice and water. Adding salt, food coloring and warm water to an ice experiment will enhance the learning experience for the children.

**Cooking Activities:** Provide many different cooking activities for the children to engage in. The mixture of wet and dry ingredients changes the final product into another form. The whole process of cooking relates to scientific inquiry.

**Read The Following:**

***Whales Giants of the Deep*** by Adele D. Richardson
***Humphree The Lost Whale*** by Wendy Tokuda & Richard Hall
***Baby Whales Drink Milk*** by Barbara Juster Esbensen
***I am a Whale*** by Darlene R. Stille
***Snow*** by Lois Ehlert
***The Snowy Day*** by Ezra Jack Keats

## *Teachers may begin to see children:*

- Understand the difference between Identify hot and cold

## *Tips to help children understand energy and matter:*

▪ *Discuss the different reasons why temperature can be so varied and different.*

▪ *Provide science experiments where children can see the what happens next to the experiment when the temperature is changes ( e.g., putting drops of food color on top of warm whole milk and then see what happens when you put them on cold whole milk). Ask the children to predict the outcome.*

## Life Science

Understanding that all life forms, at all levels of organization, use specialized structures and similar processes to meet life's needs.

**Content Standard 6.0**
***(Structure and Function)***

***Teacher Activities:***

**Leaves**: Materials: Variety of leaves, magnifiers, tape, copy paper, crayons, spray bottles. Ask families to bring in leaves from their homes or a neighborhood park, or go on a nature walk to collect a large bagful. Encourage children to explore the leaves with their senses. If you cover a tub full of leaves overnight, the aroma will be very strong the next day. With the children, make posters or decorate a bulletin board that shows ways you can classify leaves (color, shape, size, seriation, patterns). Ask the children to hypothesize why leaves change color. As the weather cools, leaves stop producing chlorophyll, which is green. The colors in fall are the leaves true colors.

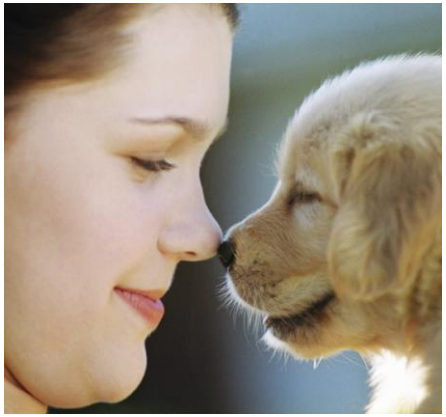
**Share the following books:** ***Growing Vegetable Soup*** by Lois Ehlert**,** ***The Carrot Seed*** by Ruth Krauss, or ***The Tiny Seed*** by Eric Carle

**Monster Repellent:** Materials: Water, spray bottle, food coloring, a few drops of cologne or some essential oils.
Fill the spray bottle with water and add a few drops of cologne or the essential oils and if desired, a few drops of food coloring. Have children spray the monsters away while using their sense of smell. This activity works well with the book, ***There's a Monster Under My Bed*** by James Howe.

**Scented Play dough:** Try unusual scents in your basic play dough recipe such as ginger, cinnamon, coffee, flavored Kool-aid, and etc. (Avoid using peanut butter due to allergy concerns).

**Sensory Bin Ideas:** Water, Bubbles, Leaves, Bread Dough, Mashed Potatoes, Goop or Oobleck, Magnetic materials, Sand, Mud, Beans, Rice, Paleontology (bones, mud, brushes), Rocks, Colored Pasta, Sink and Float, Boats, Ice experiments, Fossils, Sea shells, Bubble Wrap, Bathe a baby, Corn Meal, Flour, Popcorn, Shredded Paper, Cooked spaghetti, Bird seed, Potting soil, Salt, Wrapping Paper

**Sensory Bin Props:** Measuring Cups, Spoons, Scoops, Water/Sand Wheels, Bowls, Pitchers, Small Animal Figures, Cars and Trucks, Dinosaurs, Sponges, Dolls, Tubes, Magnets, Bones, Sifters, Funnels, Strawberry Baskets, Toilet Paper Tubes, Brushes, Shovels, Rakes, Watering Can, Seeds, Plant Pots



## *Teachers may begin to see children:*

- Identify humans, animals, and plants
- Use their five senses to explore and investigate the natural world.

## *Tips to help children understand Structure and function:*

▪ ***Provide many opportunities for the children to use their sense of smell, touch, sight, taste and hearing to examine the world around them.***

▪ ***Discuss the different characteristics that animals, humans and plants have. Ask the children to explain what they all have in common.***

## Life Science

Understanding that organisms respond to internal and external influences.

**Content Standard 7.0**
***(Internal and External Influences on Organisms)***

### *Teacher Activities:*

**Having a pet and/or live plants in the classroom will help to reinforce these concepts.**

**Root Vegetable Tops**: Materials: Carrot Tops, Radish Tops, Beet Tops, Turnip Tops (about one inch each), water, knife, small container such as a tuna fish can, soil ruler. Have the children cut the tops off of carrots, radishes, beets and turnips. (The teacher needs to supervise the vegetable cutting.) Place the tops in a small container of water. Cover most of the plant top in water. If you are planting them in soil, place the tops about one inch from the surface. The children can chart and graph the growth of the plant tops.
After the children have planted the tops or placed them in water, ask the children to hypothesize what will happen to them. Ask the children open ended questions about whether or not the plant will grow.

**Effect of Light on Plants**: Materials: Grass seeds, soil, water, bowls or cups, newspaper. Cover a table with newspaper and place the grass seeds with soil, water and bowls. Allow the children enough time to plant the grass seeds in their bowls. Ask the children if they want to plant them in the light or the dark. Be sure to label them so there isn't any confusion. Place the plants that are to be grown in the dark into a large box or a dark cabinet in the classroom. Place the plants to be grown in the light in a window or a bright area in the classroom. After the children have planted their plants and have determined which place they will be growing, ask the children open-ended questions about what will happen. Have the children write or draw what they think their plant will look like. After a couple of days, have the children gather their plants in the dark and compare them to those plants that have been grown in the

## *Teachers may begin to see children to:*

- Identify the basic need for air, water and food.

## *Tips to help children understand internal and external influences:*

- ***Give children opportunities to care for plants and animals in the classroom.***

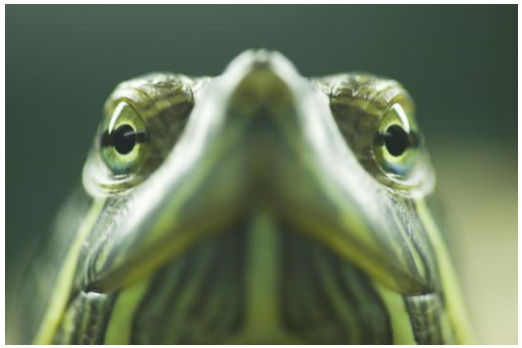
- ***Plant a class garden and have the children help to maintain it. Start the seeds in the classroom and the transplant them out doors in a container. When the plants mature eat them in the classroom.***

- ***Provide experiments that reinforce the basic needs of air, water and food (e.g., try to grow seeds without providing water or give plants to much water. Ask the children to make a prediction about which plant will grow and why.***

**Life Science**

Understanding that life forms are diverse, and that they pass some characteristics to their offspring.

**Content Standard 8.0**
***(Heredity and Diversity)***



### *Teacher Activities:*

**Animal Families:** Provide the children picture cards or animal figurines to sort into families. Help the children with animal offspring vocabulary (kitten, kid, colt…). More props can extend the play: strawberry basket "cages", fences, barns, box "caves."

**What Animal am I?** Pin a picture of an animal on the back of one of the children in the group. Don't show him the picture. Have him/her turn around to show the group. Then he/she asks questions to find out the identity. "Do I have fur?" "Do I have wings?" The other children can answer yes, no or maybe. (To adapt for younger players: Show the children the selection of pictures before playing. Start with just a few choices of animals. As their questioning improves add more types of animals.)

**Animal Pairs:** Prepare picture cards of animals. Provide two of each animal. (Find pictures in lotto games, children's playing cards, and coloring books) Pass out one card to each child. Have them keep their animal secret. Then, all of the children act like their animal with movement and sounds (no talking). Each child looks for the child that is acting out the same animal.

## *Teachers may begin to see children:*

- Discuss and investigate animals and their offspring.
- Explore and identify a variety of animals and plants.

## *Tips to help children to understand heredity and diversity:*

▪ ***Have children match the pictures of the plants to the seeds that produce the plants. Include vegetables, fruits, weeds and house plants.***

▪ ***Provide the pictures and vocabulary so that children can research, match and begin to understand that animals can have similarities and differences.***

▪ ***Discuss the different characteristics that animals have such as birds fly, lay eggs and have feathers and cats have fur and deliver live babies.***

**Earth and Space Sciences**

Understanding that Earth systems have a variety of cycles through which energy and matter continually flows.

**Content Standard 13.0**
***(Cycles of Matter and Energy)***

***Teacher Activities:***

**Observe and identify weather from day to day.**

**Junior Meteorologist**: Materials needed: Overhead projector, overheads of maps, weather patterns, and etc., pretend microphone, white sheet or projector screen, pointer, newspaper clippings of weather maps, video clip of the evening weather report. Show children the video of what the evening weather report looks like. Set up the projector and screen in the classroom. Children use the props to pretend they are the classroom meteorologist.

**Provide Assorted Dramatic Play Props:** Provide clothing and props that would be used for different weather seasons.

**Read:** ***The Wind Blew*** by Pat Hutchins, ***Rain*** by Robert Kalan, ***Wet or Dry*** by Bruce MacMillan

## *Teachers may begin to see children:*

- Observe and identify weather from day to day.

## *Tips to help children to understand cycles of matter and energy:*

▪ ***Discuss the different weather systems that we see in our state (e.g., snow, rain, wind, fog, clouds, thunderstorms, and dust devils).***

▪ ***Have the children chart the daily temperature and ask them to predict what the temperature will be for the day. Provide a thermometer outside of the classroom so that they can see if their prediction was accurate.***

**Environmental Sciences**

Understanding that ecosystems display patterns of organization, change, and stability as a result of the interactions and interdependencies among life forms and the physical components of the Earth.

**Content Standard 15.0 *(Ecosystems)***

***Teacher Activities:***

**Identify animals and their homes.**

**Flannel Board Habitat** - Materials: Flannel board, pictures of animals printed from the internet or cut out from magazines (animals should reflect a variety of habitats), flannel scraps or Velcro pieces, glue, cardstock, markers. Glue either flannel pieces or Velcro to the back of each picture, using cardstock prepare labels that read; POND, SKY, DESERT, FOREST, OCEAN, etc., place flannel or Velcro on the back of each. Ask children to think about each animal picture and where they might live. Ask what qualities the animals would need to live in the different habitats. Ask children to place animals beneath the correct labels on the flannel board.

**Read:** ***Have You Seen My Duckling?*** By Nancy Tafuri

## *Teachers may begin to see children:*

- Identify animals and their homes in their natural habitats.

## *Tips to help children understand ecosystems:*

- ***Show the children pictures of different animals and ask them to explain where they live.***
- ***Provide props to the block area and encourage the children to build different animal homes.***
- ***Take the children for a walk in the neighborhood and ask them to spot the different animal homes that they can find.***
- ***Ask the children to describe where different animals live and to explain why they need to live there.***

## Scientific Inquiry: Processes and Skills

Understanding that science is an active process of systematically examining the natural world.

**Content Standard 21.0**
***(Scientific Values and Attitudes)***

### *Teacher Activities:*

**Adopt a Tree**. Choose a tree near the classroom to adopt. Draw a picture of the tree each month and discuss any changes. Ask questions such as: Are there leaves? What color? How many? Are there animals in the tree? What are they doing?

**Create a mini-weather station outside of the classroom**: **Make a Rain Gauge**: Materials: Straight sided jar, tape, plastic funnel that fits in the jar, ruler, strip of paper, pencil, modeling clay. Use the ruler to draw marks every 1/8" on the piece of paper. Tape this scale to the outside of the jar. Tape it facing inward, so you can read it through the jar. Place the funnel in the top of the jar. Make sure it is fixed and watertight by putting a layer of modeling clay between the jar and the funnel. Place the rain gauge outside to collect water. Record the depth of rain in the rain gauge every day. Empty the water every day. Record the results on a graph.

**Make a Barometer to Measure Air Pressure:** Materials: Glass jar with a wide mouth, balloon, scissors, drinking straw, strong rubber band, tape, cardboard. Cut the neck off the balloon with the scissors and stretch the rest of it tightly over the top of the jar. Hold it in place with the rubber band. Cut one end of the straw into a point. Secure the other end to the middle of the balloon using the tape. Make sure that the straw is horizontal and exactly in the middle. Place your barometer inside or outside, but keep it out of the sun. Place a piece of cardboard behind the point of the straw and tape it in place on the jar. Mark the position of the straw pointer on the cardboard. Above and below this mark, draw a scale in inches or millimeters. As the air pressure changes, the pointer will move up and down on the scale. The higher the pressure, the higher the pointer will rise. When air warms up, it gets lighter and rises. When this happens over an area, there is less air pressing down on the balloon. The air inside the bottle pushes up, causing the end of the straw to move down, indicating the air pressure is falling. Low pressure brings stormy weather. If the end of the straw is moving up, meaning air pressure is rising look for clear skies!

**Make an Anemometer to Measure Wind Speed**: Materials: 3 yogurt cups all the same size, 3 knitting needles, a large cork, a dowel or broom handle, a nail that is longer than the cork, and 2 washers. Paint or make a mark on one of the yogurt cups. Make two holes on opposite sides of each yogurt cup, 1 ¼" from the top. Put a knitting needle through the holes in each cup. Push the needles into the sides of the cork so that they are equally spaced around it. Make a hole through the center of the cork and put the nail through the hole so that the point sticks out of the bottom. Put the washers on the end of the nail. Hammer the nail into the top of the pole so the cork can spin around easily. Stick the pole into the ground in an open space. When the wind blows, the anemometer will spin around. Watching the colored cup, count the number of complete turns it makes in ten seconds. Record the time and speed on a chart.

**Modeling questions in the classroom will help children understand the importance of asking their own questions. Be sure to use open-ended questions rather than those with only a "yes" or "no" answer. QUESTIONING is a crucial strategy in teaching and it must lead to meaningful and reciprocal exchange. "When more teachers recognize that the facts they teach today will be replaced by the discoveries of tomorrow, the content-versus-process controversy may be resolved."**

**The following are examples of open-ended questions:** What are the different parts of the _____. Why did you like the _____? What do you think might happen next? What do you think is going to happen? What could you add to the _____ to make it better? Is there anything else you would like to add to your _____? What did you like best? Why? What might happen if _____? What other ways can you think of? How are a _____ and a _____ alike? How are these shapes alike? Which is bigger, more, heavier, longer, shorter? How can we find out? Do we have more _____ or more _____? How do you know? How did you do that? What comes next? What could you do with these?

## *Teachers may begin to see children:*

- Observe their world.
- Ask questions about their world.

## *Tips to help children understand scientific values and attitudes:*

▪ ***Provide experiences for the children to learn about the greater community and other important issues outside of the classroom.***

▪ ***Try to encourage parents and other family members to come in and share their expertise in the classroom. Take children for walks; invite guests to share their knowledge, and create opportunities to expand the children's knowledge about the world around them.***

## Scientific Inquiry: Processes and Skills

Understanding that a variety of communication methods can be used to share scientific information.

**Content Standard 22.0 *(Communication Skills)***

***Teacher Activities:***

**Share ideas with others**. At circle time, have children share the discoveries they have made during the day. They may either share with the whole group or use buddy talk. Buddy talk is the technique of giving the children a topic to discuss with one or two neighbors.

Put clipboards, paper and pencils at the science center. Encourage children to draw pictures of their explorations. Colored pencils can be added to write "recipes" for color mixing.

When children are sorting or classifying, ask them to share their methods and sorting rules with other children.

Provide resource books such as picture encyclopedias, picture fact books and magazines that match the theme of the materials at the science center. (Magnets, weather, shells) When children ask questions, help them to locate information from resource books.

Have children communicate through art, performances, writing, charts and graphs.

**Help your children learn about the Scientific Method:**

Purpose: What do you want to learn? (Identify a problem.)
Hypothesis: Predict the answer to the problem.
Research: Find out as much about your topic as you can.
Experiment: Design a test to confirm or disprove the hypothesis.
Analysis: What happened during your experiment?
Conclusion: Was your hypothesis correct? How do you know?

**The Scientific Method for Little Learners:**

Look and ask
Predict
Test
Find out
Look and ask again

## *Teachers may begin to see children:*

- Begin to share their ideas with others.

## *Tips to help children understand Communication skills:*

▪ ***Encourage the children to share their thoughts and ideas. Remind the children that everyone views things differently so to be respectful when differing opinions are formed.***

▪ ***Promote using scientific methods when children are examining, discovering and exploring new objects and materials.***

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www.exploratorium.edu/

www.doe.nv.gov/equity/prekstandards.htm (To download complete copy of Nevada's Pre-K Standards)

www.hippyusa.org (Home Instruction for Parents of Preschool Youngsters)

www.patnc.org (Parents as Teachers National Center)

www.pbs.org (PBS)

www.naeyc.org (National Association for the Education of Young Children See Position Statement on School Readiness and Signs of Quality Programs)

www.nas.edu or www.4nationalacademies.org (National Research Council)

www.pppctr.org (Practical Parenting Partnerships)

www.familyeducation.com (Family Education Network)

www.icdlbooks.org/ (International Children's Digital Library).

www.nea.org/parents (National Education Association)

www.ncpie.org/ (National Coalition for Parent Involvement in Education)

www.npin.org (National Parent Involvement Network)

www.pta.org (Parent Teacher Association)

www.teachersandfamilies.com (Teachers and Families Working Together)

# Appendix

The Pre-K Content Standards are guidelines for teachers to use when developing learning experiences for young children that are grounded in the following guiding principles:

## Guiding Principles

### 1. Children are active learners.

- Children are not passive learners. Instead, they learn through physical, social, and mental activities (Piaget & Inhelder, 1969; Bredekamp & Copple, 1997). Because children learn through firsthand actions with objects and things in their world, their learning occurs and is linked to the overall environment and their cultural experiences (Vygotsky, 1986).

- As active learners, young children need opportunities to observe things and events in their here-and –now world, develop their own ideas, try them out, find out what happens, and come up with their own answers(Dewey, 1944; Glassman, 2001).

- Play is how children find out about their world. All types of play–manipulative play, play with games, rough-and–tumble play, and socio-dramatic play – provide children with opportunities to try things out, see what happens, and learn (Rubin, Bukowski & Parker, 1998).

- Organizing children's learning spaces through centers of interest is a good way to help children learn. Centers are clearly marked, organized play and work areas with a theme. Centers encourage children to make decisions, learn new skills, practice skills previously gained, as well as interact with others.

- Centers offer children and teachers a great deal of flexibility. Because they do so, centers may support the needs of the children, especially diverse learners. For example, the needs of children with physical disabilities can be accommodated by providing pathways, low tables, or other necessary adjustments.

Those children who need privacy or les stimulation can be offered quiet, protected centers and spaces for active learning.

2. Development and learning are interrelated.

- Learning about oneself, developing social skills and achieving motivation are all part of intellectual development. Children's ideas about themselves affect not only interactions with others, but also how they understand themselves as learners (Ladd, 1990). In turn, children's intellectual abilities and their control over language are also linked to their social skills. Children who can use language well in social situations or those who can understand another person's point of view are more likely to be those with strong social skills.

- Likewise, learning to write and read depends in great part on how children feel about themselves and their ability to achieve (Bandura, 1997). Children who believe they can learn, and expect to achieve, do so (Seefeldt, Denton, Galper & Younosai, 1999).

3. Growth and learning are sequential.

- Growth and learning move in a basic sequence (Berk, 2001). For instance, learning generally proceeds from the concrete to the abstract. The early years are when children learn best from concrete, firsthand experiences. These firsthand experiences will help children with their ability to express their ideas through drawing, painting, and verbal and written descriptions (Bredekamp & Copple, 1997; Piaget & Inhelder, 1969).

4. Each Child is an individual learner.

- Each child is an individual. Each will grow, develop, and learn at his or her own pace. Because children's development is due to both biological maturity and the environment, the rate of their development and learning varies. Therefore, actual age is not the best sign of where a child should be developmentally.

- Even though development and learning occur in an orderly way, development is often uneven. Some children will move ahead in language learning while being behind in physical or motor development. Others will demonstrate a skill one day and not repeat it for another month.

- A child's genetic makeup may be related to health growth and development, but an environment that does not provide good nutrition or language experiences may slow down healthy growth. Severe disabilities affect normal growth and development as well. Children with disabilities may benefit more from early intervention that those without these disabilities.

5. Development and learning are embedded in culture.

- Culture, the social context in which children learn, grow, and develop, is defined as the language, knowledge, beliefs, art, moral, laws, customs, and ways of living that are passed on to future generations (Cole, 1999). Social groups, the family, neighborhood, religious or ethnic groups within a society pass on their customs, values, or moral principles to the young.

- Beginning at birth, the culture socializes children to become members of a society. But children are not just products of the culture they grow in. As children grow, they may decide what to model from the cultural influences they are exposed to, shaping their cultural context over time (NRC & IM, 2001).

6. Family involvement is necessary.

    - To develop a close attachment between young children and their families demands family involvement. Teachers should consider each child's unique circumstances, respect each family, and encourage involvement between families and preschools to help with a child's academic success and later school achievement
      (NRC, 2001a).

- Family members and teachers must work together. Preschool experiences build on and extend what children learn at home. In turn, children's learning in school is extended and continued in the home.

7. Children's learning can be clarified, enriched, and extended.

- Appropriate early educational experiences can extend, expand, and clarify the ideas, concepts, language and social skills children gain spontaneously. With the guidance of highly knowledgeable, trained, and skilled adults who understand both children and what children need to know, children can learn more than could on their own (Vygotsky, 1986).