Washington State Training & Registry System **(STARS)**

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Study Guide & Workbook for:
STARS 10 Hour Course

Pre-Science Skills

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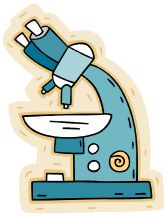


Pre-Science Skills

One of the most enjoyable areas for young children is Science. They are natural scientists. Children always wonder “why?” Children are learning about the world around them and no area is of higher interest than science!

With this in mind, your classroom should set up activities that will engage the young scientist! Build on the child’s natural curiosity. Provide science activities/lessons, science books in the reading area, as well as science orientated items at learning centers.

Science in the Preschool means exploring, experimenting, discovering, and developing an awareness of the changing world. Science is also engaging in activities such as observing grass row, watching butterflies emerge from their chrysalis, studying and researching ponds and owls.

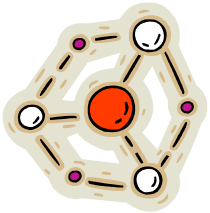
In Preschool classes, children should study the natural sciences by having animals in the classroom, observing growth in themselves and others, and following the weather. Preschool science study consists of concrete experiences: When children cook or bring snow into the room and watch the changes, they are studying the physical sciences and gaining an understanding of changes and properties. Other science activities include using magnets, color wheels, and magnifying glasses. As the children explore, their observations lead to “scientific” predictions and eventually to finding ways to record their observations.

Preschoolers by nature love to explore. They are curious, ask questions and love exploring their world. You might ask "what kind of science activities can preschoolers do?" What can't they do?

Science for preschoolers can include things that they see in their everyday environment at home, in their neighborhood and the outdoors. Preschoolers benefit from exposure to science. Encourage the child to ask questions and try to make science fun to learn. Expose the child to early science by

collecting rocks, cooking in the kitchen, reading about weather/seasons, dinosaurs, and space, etc.

There are many everyday experiences that can focus on science concepts. Mixing kool-aid with water and noticing the change of color in the water is an opportunity to discuss mixing colors. The kitchen can be a home science lab for measuring and cooking concoctions. Playing with water and toys can show what sinks and what floats.



Tips to consider in having fun with science:

- Provide hands on experiences for learning science concepts.

- Listen to the preschoolers make their own observations as they learn.

- Focus on everyday experiences that the child can relate to.

- Use fun objects to include in learning about mixing colors, playing with sand, playing with sound, magnetism, etc.

Preschool curriculum should also include early science processing skills as an integral part the classroom activities as children investigate concepts and evaluate their learning:

Observing -- notice different properties of objects and events using the senses
Classifying -- grouping objects and events according to their properties
Measuring and Using Numbers -- be able to:
Describe quantity using physical attributes such as length, weight size, temperature
Estimating
Recording data with the help of teachers or by themselves with drawing and other tools
Spatial relationships

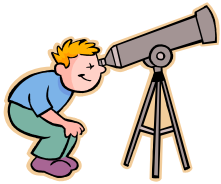
Communicating -- using language, drawings and other tools to describe observed events and relationships

Inferring and predicting -- making predictions of what might happen based on past observations and experiences, including cause and effect relationships

Defining operation -- define terms and ideas used in the context of one's experiences and communicate how these terms are used, such as "what do you do" and "what you observe"

Making hypotheses -- propose explanation based on what is observed

Experimenting -- explore, manipulate, investigate to find what happens



Teachers play an important role in planning, supporting and guiding children to learn about math and science pre-concepts through the use of various teaching strategies that scaffold the children in process. All of these begin with the teacher observing and listening carefully to the children's interests, and understanding how children learn in order to plan activities that are real and meaningful in the lives of the children. In scaffolding the children in activity settings, teachers may use a variety of techniques such as asking the open-ended questions of what, how, and why; modeling; giving feedback; and cognitive structuring (providing structure for acting and thinking).

In short, preschool children should learn by engaging in activities that are real and meaningful to them - activities that encourage the development of skills, knowledge, ways of thinking and learning, and a disposition for learning. It is important to remember that preschools teach children the early skills for literacy and science and mathematics development in an environment that encourages learning through social relationships.

Particularly, in the case of teaching science to early learners, a learning environment would have to cater to the subject. Depending on the theme of the science class, teachers would have to prepare themselves. In this preparation, one would need to be well aware of developing the classroom

environment. A class with props and particular books, charts and even games would be ideal. The games are essential as they provide a healthy entertainment experience along with familiarizing children with characters in the subject. For instance, in a science class, teachers may want to teach their students about animals. For this, they would have to introduce games/activities making use of animal characters.

As an alternative to teaching science in the classroom, outdoor activities are also very important. This is because of the fact that adventure for children is highly stimulating, and early learners are keen to move beyond the four walls of their classrooms.

As a result of the success that fieldtrips, activities and the like have had on early learners, it must be asserted that Activity-based learning is now a regular practice at preschool, as it brings out the best in early learners. Since a subject like science is one that is certainly not short of matter around one, science can be taught almost everywhere to early learners. For example, on fieldtrips, teachers may teach their young learners about the advantages of a safe environment; they may teach the children about keeping the environment clean when they go for picnics or evening for shopping. Children can be shown that the environment can be protected through not littering the place for instance. This helps children to also grow consciously, and realize how they must protect an already vulnerable planet.

In addition to teaching children about the environment on a fieldtrip, they may also be taught about other things in nature, for instance, they may be explained the natural processes through which the earth's air is protected. This of course, they should be taught with a very general view, otherwise they would get confused. In addition to this, they can be shown what kinds of living things depend on others for survival in the environment. They can be shown particular animals that rely on trees for survival. Also, they must be taught about how human beings need the environment, in particular, trees and other forms of vegetation. One would be amazed if they were to experience for the first time, early learning of science in this manner. This is because of the manner in which children manage to absorb a great deal in a very quick time.

Simple Science Processes in the Classroom:

Collecting

Most kids have a lot of something, whether it's magnets, pens, toy cars, or rocks. Encourage your child to view these things as a collection of items and have them on display or kept in a box for easy show and tell. Your children will be proud of their collections and will get a thrill out of finding more items to add to it every day. Share your collections with your child also. Most people are natural collectors of something, even if it is shoes!

Observing

Kids notice everything and ask a lot of questions. Your child may one day say, "The paper carrier didn't come today." When you had no idea she even knew you had a paper carrier. Teaching your child to observe things will be easy. All you need to do is direct them towards something to observe. The seasons of the year are a good start. If you live in warm climates watch the news for signs of the seasons. Try to observe things that are around your home. Observe the birds in your yard, the dog next door, a banana as it turns brown, or even the routine of a parent.

Estimating

How many potatoes will it take to fill up this bowl? How many cups of water to fill up this pitcher? How many cookies are in the jar. How many steps will it take to get to bed. These are some good examples of estimating games. See if you can think of some more.

Measuring

The kitchen is a great place to start learning measuring skills. The more you involve your child in baking, the more she will learn. Keep a record of your child's height and weight, this is a great ongoing project.

Classifying

Putting the groceries away is a good sorting game for children big enough to help. They can take the items out of the bags and put them

next to the refrigerator, freezer, and counter for you to put away. Laundry is a good place to sort also. Your child can separate the clothes into piles of colors, and into stacks of ownership when they are clean.

Ordering

Talk about the sequence of events for the day with your child. Chances are she will know the schedule better than you. You can arrange pillows or stuffed toys from smallest to largest.

Making Data Tables and Graphs

This is a great way to make a difference in your child's science education future, put it on paper. Make charts of anything you can think of, like how many birthdays are in each month or how many glasses of juice you drink a day. Anything you can put to paper is a step in the right direction.

Predicting

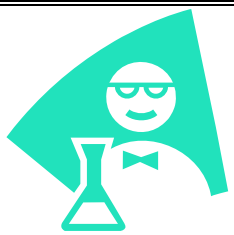
It is wonderful to hear children give their bests guess as to what something is, how something is done or why some things happen. Hide a part of a picture and see if she knows what it is. Set out some kitchen gadgets and see what she comes up with, or plant some different items and predict if they will sprout. Try this with things that are unfamiliar to your child.

Establishing Cause and Effect

Ask your child a lot of "What will happen if..." questions. What will happen if you drop an egg on the floor, on a pillow or on a sponge. What will happen if you drop a crumpled piece of paper and a flat piece of paper? Which will hit the ground first?

Problem-Solving

Involve your child in your everyday problem solving activities. What is for dinner is a favorite of mine. What do we need to make the meal? Have your child help you determine what cleans a stain the best, water, vinegar, or soap.



Botany in the park: A teacher takes a stick, draws a rectangle around a tree and asks children to see what they can find. She is expanding observational skills, says Sprung. When preschoolers spend time observing, they learn which trees lose their leaves in winter and which ones have buds in spring. They collect leaves and sort them by size and shape. They watch the birds and squirrels and other animals, and learn to share their observations through discussions, drawings, charts, and graphs.

Physics on the playground: Seesaws, slides, swings, and bouncing balls make the playground a natural physics lab. The seesaw demonstrates principles of balance, the slide is an experiment in gravity, and swings are laws of motion in action, says Sprung. The teacher can encourage children to think and question by challenging them to balance the seesaw with kids of different sizes. She can relate the way the seesaw balances to the balance scales in the classroom. She can encourage her students to look under the seesaw to see how it works and which parts move. In this way, they investigate principles of weight and mass.

Explorations at the water and sand tables: Children make sieves with different size holes and pour sand or water through them, noting how the size of the hole affects the results. At the water table they learn the

properties of water as they predict whether objects will sink or float, then test their predictions.

Chemistry in the kitchen: While they help prepare vegetable soup, preschoolers name the ingredients as they sort them and add them to the pot. The teacher asks questions about the color, texture, and smell of the carrots, onions, and tomatoes. She may ask what a tomato will look like when she cuts it open. As the soup simmers, the class will predict which vegetables take longer to cook. The teacher may take pieces of carrot or potato out for children to poke with toothpicks to test their hypotheses. They may add spices and compare taste. Later, when they eat the soup, the children can talk about the differences in taste and texture among the vegetables.

Relativity in the block corner: Children build towers and balance blocks of different sizes and shapes to construct bridges, exploring concepts of spatial relations, gravity, and balance. Sprung finds that preschoolers learn basic principles of physics by building ramps of different heights and racing cars down them, predicting which car will finish first.

Meteorology at circle time: The preschool day often begins with a discussion of the weather. Is the sun out today? How does the sun feel on our skin? Why is sun important? Is it raining? How does rain feel? Why is rain important? Some classes may keep a container to measure and compare

rainfall. Is it colder or warmer than it was yesterday? How do we know? Is it cold enough for snow? Children record their observations in diagrams and charts.

Horticulture on the windowsills: The class might grow beans. Each child has a tiny clay pot. He plants a seed in the pot, filling it with soil and patting the dirt down around the seed. Every day he will water the plant and record its growth on a chart. He will learn what seeds require to sprout, and, later, what they need in order to grow.

Biology in the fish tank: Some classrooms have rabbits, gerbils, or guinea pigs; others have fish or earthworms. These creatures teach children how living beings interact with their environment and react to different stimuli. Preschoolers take responsibility for caring for the animals: recording the temperature in the fish tank, learning about the earthworm's habitat, finding out what the rabbit and gerbils and guinea pig eat and measuring out their food. Children observe the animals' habits, measure and weigh them, and record their growth in pictures and charts.