

Math and Science For Early Learners



Now, let's explore...

Math and Science For Early Learners



**What are our
first and most
important tools
for exploring
math and
science?**



Our Natural Senses

- Sight – Vision
- Sound – Hearing
- Taste – Gustatory
- Touch – Feeling
- Smell – Olfactory



What other things do children need so that they can explore and learn more about math and science?



Time

Opportunities

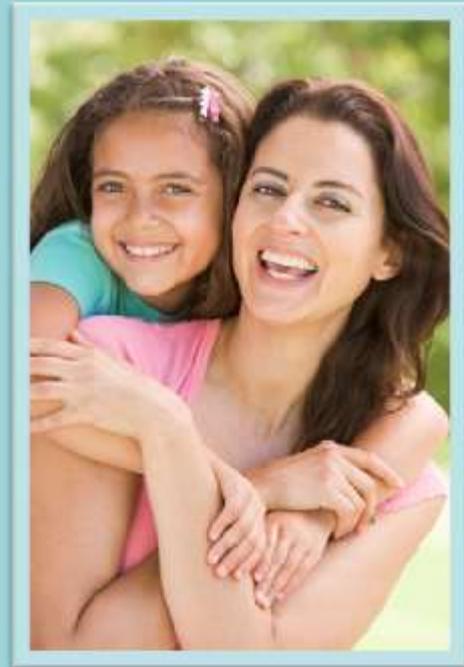
Guidance

Support



Who provides ...??

- Time
- Opportunities
- Guidance
- Support



**Loving adults
provide
support for
children to
explore and
learn!**



Where do we find learning opportunities?



Wherever we are!



**What
kind of
learning
related to
math and
science
could be
taking
place
here?**

A young girl with a pink tiara and a white long-sleeved shirt is smiling and holding a large, round, textured object. The background is a soft, out-of-focus pink and green. The text is overlaid on the right side of the image.

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Math and Science: Infants and Toddlers



Math and Science: Infants and Toddlers

Allow infants and toddlers to explore their world and the objects around them...

- Touch toys with different shapes and colors.
- Feel various textures.
- Arrange things by size (big, small).
- Taste a variety of foods.
- Squeeze things through their fingers (bananas, peas, playdough).



Math and Science: Infants and Toddlers

Provide outdoor experiences in different types of weather...

- Take frequent stroller rides.
- Allow children to play in the grass.
- When walking outdoors, look for birds, ducks, rabbits, butterflies, flowers, trees, and more.
- In warm rain, talk about how it feels when the wet drops touch your skin.
- Look at the sky and describe the way the clouds appear or other things you see.



Math and Science: Infants and Toddlers

During regular care activities, talk about what you are doing and what you can see...

- Describe the colors and smells in the room.
- Mention the names of the objects you're using.
- Comment on sounds you hear around you.
- Count out loud (e.g. as you go up or down the stairs, as you set objects on a table).
- Talk about processes such as mixing the child's food ("I'm going to put the milk in the cereal and then stir it for you. When it is ready, it will be yummy to eat.").



Math and Science: Early Preschool & Preschool Ages



Math and Science: Preschool

Provide preschool children with many activities and time to explore...

- Sort and classify objects by various characteristics, count and group items (such as by texture, size, shape, color, sound, etc.).
- Encourage creative ways to use materials (take apart, put together).
- Use real tools whenever possible.
- Help children learn to predict, experiment, investigate, analyze, and talk about cause and effect (if we do this, what happens?).
- Expand on language by using lots of new vocabulary (new words, new concepts).
- Include books and other learning materials to increase interest.



Math and Science: Preschool

Provide outdoor experiences in different types of weather...

- Play outside at least an hour a day (weather permitting).
- Allow children to engage in free play when outdoors.
- When going on walks, look for animals, trees, flowers, insects, habitats, and more.
- Talk about the changes in the weather and the various seasons.
- Provide natural objects that can be used in many different ways (e.g. sticks, rocks, leaves, feathers, pine cones, flowers).



Math and Science: Preschool

During routine times of the day, encourage the children to be involved in the process...

- Ask the children to help set the table for snacks or meals (count the number of plates, spoons, cups, napkins, etc.).
- Ask the children to count how many friends are at school today, how many friends are not at school, etc.
- Have the children describe the sequence of the daily routine – and then do it backward, for fun.
- Ask the children what the weather is like today and what it was like yesterday (concept of time and continuity).



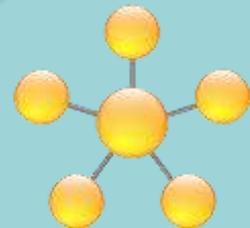
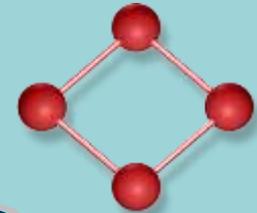
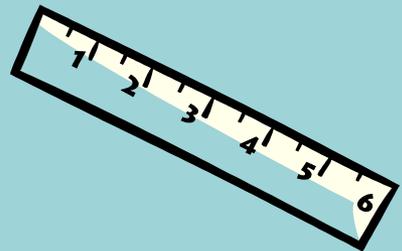
Math and Science: Preschool

During regular care activities, talk about what you are doing and what you can see...

- Describe the routine of the day (first we will..., then we will..., and after that we will...).
- Encourage children to be helpers and learn to take responsibility by caring for themselves and others (self-help and other-help processes).
- Allow the children to take part in setting up, organizing, cleaning, taking care of the environment.
- Incorporate animals and/or plants into your learning environment and have the children learn how to care for them.



Math and Science: Various Learning Areas





Math and Science: Creative Arts

What can children learn related to math and science when involved in creative art experiences such as painting?

- There are many different colors to use. Each color has its own unique tone.
- Paint has to be wet to spread it around on the paper.
- If I push harder on the brush, sometimes the color gets darker.
- I can create lots of lines or circles or whatever designs I want.
- If I mix two colors, I can create a new color.
- If I fold the paper, the paper changes in size and shape.

Math and Science: Blocks

What can children learn about math and science while building with blocks?

- There are many sizes and shapes of blocks.
- Flat blocks can be stacked on each other IF they are about the same size or IF a smaller block is stacked on top of a larger block.
- Round blocks don't stack very easily but round blocks with flat bottoms can be stacked.
- By balancing blocks carefully, tall structures can be built.
- Blocks of different sizes (and different shapes) take up different amounts of space (spatial relations).





Math and Science: Winter Outdoors (Snow)

What can children learn about snow?

- It is cold.
- It is white.
- It melts when it gets warm.
- It comes in the winter when temperatures are cold.
- It falls from the sky – comes from clouds.

How does this learning relate to math?

How does playing with snow relate to science?

Math and Science: Summer Outdoors

What can children learn about math and science when exploring outside during the summer?

- The air is warm.
- The grass is soft.
- Some trees have leaves. Some have needles. Some have flowers, some do not have flowers.
- There are many colors, shapes, and different types of trees and flowers.
- It is easy to find insects in the summer.
- There are many different types of insects. Some fly and some crawl – and some do both.
- Trees have rough bark. And different trees have different types and colors of bark.
- Sand can be packed together to make structures.



Math and Science: Cooking Activities

What can children learn about math and science when engaged in cooking or baking experiences?

- There are many ingredients from which we can make food.
- Some ingredients can be eaten alone while other don't taste good unless mixed with other ingredients.
- A recipe helps guide the cooking/baking process.
- Measuring each ingredient means that you use the right amount based on the recipe that you are following.
- All the ingredients mixed together make something that is different than any of the ingredients by itself.



Math and Science For Early Learners – A Concept Approach to Learning Across Domains (Areas)

Purpose: Enhance and Extend Learning Related to Math and Science by Studying a Concept that Interests the Children



Learning About the Ocean

Goal: To create various learning opportunities to encourage the children to enhance their knowledge about the properties of the ocean and the life that lives in or near the ocean.

Learning Areas that could be Enhanced: Block Area, Creative Art Area, Book (Literacy) Area, Music Area, Home Living (Housekeeping) Area, Dramatic Play Area, Manipulative (Table Toys) Area, Water/Media Table Area, Science Area, Outdoor Area.

Possible Learning Concepts/Questions to be Explored:

- What organisms (plant and animal) live in the ocean (in the water)?
- What organisms (plant and animal) live near the ocean (near the water)?
- How is a fish different than a dolphin?
- How is a dolphin different than a bird?
- What are the differences between mammals, fish, birds, and insects?
- What do the animals in or near the ocean eat?
- How do the animals in or near the ocean get their food?
- What different kinds of whales (or sharks, dolphins, fish) live in the ocean?
- How do whales and dolphins breathe?
- How do fish sleep?
- Why is ocean water salty?
- Where does the sand on the beach come from?
- Why is the sand sometimes warm on the top and cold underneath?
- How warm is the ocean?
- Is the ocean warm in some places and cold in other places?
- What is a hurricane and why do they happen near oceans?
- What things sink in the ocean and what things float on the ocean?
- How do boats float when they seem to be very heavy?
- And many more based on the interests of the children.

Ideas to Enhance Learning Areas

Dramatic Play and/or Housekeeping/Home Living Area

- Create a seafood restaurant .
 - Add (pretend) seafood items such as plastic lobster, shrimp, fish, Old Bay (empty) containers.
 - Create a seafood menu.
- Create wetsuits or scuba diving gear out of old clothes and recyclable materials.
- Add items that could be used at the beach.
 - Beach towels
 - Sunglasses
 - Picnic basket
 - Beach umbrella
 - (empty) Sunscreen containers
- Have the children draw ocean scenes on a large piece of paper (or fabric).

Block Area

- Add plastic (toy) ocean animals such as:
 - Dolphins
 - Whales
 - Sharks
 - Fish
 - Crab
 - Birds
 - Water Snakes
- Add shells, feathers, and rocks (large enough not to be a choking hazard).
- Add small buckets and shovels.
- Add boats, ships, barges.

Science Area

- Add real objects from the beach:
 - Sand
 - Shells
 - Rocks
 - Feathers
 - Seaweed
 - Ocean water
- Add books related to the ocean and ocean life.
- Add magnifying glasses and microscopes.
- Purchase a hermit crab (and cage) and have the children help care for it.

Book (Literacy) and Music Areas

- Add books related to the ocean and ocean life.
- Have the children create their own stories about their beach vacations.
- Add photos of the beach - especially photos of the children with their families at the beach.
- Add ocean-related puppets.
- Add ocean-related music (songs).
- Make musical instruments with paper towel tubes and sand.

Enhanced and Integrated Learning through the Concept Approach

Developing a concept of study based on the interests of the children is a great way to encourage integrated learning related to math and science.

By encouraging learning throughout the various areas of our programs/classrooms, children have many chances to increase their knowledge about something that interests them.

This kind of learning increases children's understanding of concepts, increases their vocabulary, allows them to learn through a hands-on approach, develops new curiosities about which the children will want to study, allows children to "try" their ideas in a safe environment, and much more.

How do you decide what concept to explore with the children?

- By looking at the areas of interest about which the children in your program have expressed curiosities or areas of interest about which they have developed conversations (or asked questions).

Math and Science For Early Learners

- ❖ Young children are natural mathematicians and natural scientists.
- ❖ They have curious minds and are eager to learn and explore.



Math and Science For Early Learners

**By providing time,
opportunities,
guidance, and
support, we can
provide math and
science learning
experiences for
children every day.**

