KinderPage

STEM for Preschoolers Activity Guide

15 Ready-to-Use Activities for Childcare Providers

Welcome to your comprehensive STEM activity resource! This guide provides 15 tested and approved activities designed specifically for preschoolers in childcare settings. Each activity includes:

- Complete materials list
- Step-by-step instructions
- Learning objectives
- Observation prompts
- Extension ideas

Activities are organized by difficulty level to help you choose appropriate challenges for your group's age and experience level.

BEGINNER ACTIVITIES

MAGNETIC TREASURE HUNT 01

Materials:

- 1 wand magnet per child
- Collection of magnetic items (paper clips, keys, metal washers)
- Collection of non-magnetic items (plastic toys, wooden blocks, fabric)
- Sorting trays or containers
- Optional: recording sheet with pictures of objects

Instructions:

1. Introduce the concept of magnets by demonstrating how they attract certain materials
2. Hide magnetic and non-magnetic items in sensory bin or around the classroom
3. Give each child a magnet wand to explore which items "stick" and which don't
4. Have children sort discovered items into "magnetic" and "not magnetic" piles

Learning Objectives:

- Understand that magnets attract certain materials
- Develop classification skills
- Practice making predictions

Observation Prompts:

- "What happened when you put your magnet near this object?"
- "How did you know if something would stick to your magnet?"
- "Were you surprised by any of the things that did or didn't stick?"

Extension Ideas:

- Test the strength of different magnets
- Test if magnets work through materials (paper, cloth, thin plastic)
- Create a chart showing magnetic/non-magnetic items

02 COLOR MIXING EYEDROPPERS

Materials:

- Clear containers or ice cube trays
- Water
- Food coloring (primary colors: red, blue, yellow)
- Eyedroppers or pipettes
- White paper towels
- Smocks or aprons
- Waterproof mats or trays

Instructions:

1. Fill clear containers with water
2. Add red, yellow, and blue food coloring to separate containers
3. Demonstrate how to use eyedroppers safely
4. Encourage children to mix colors in empty containers or on paper towels
5. Discuss new colors created through mixing

Learning Objectives:

- Understand primary and secondary colors
- Develop fine motor skills
- Practice cause and effect

Observation Prompts:

- "What happens when you mix yellow and blue?"
- "How did you make green/orange/purple?"
- "What colors could we mix to make brown?"

Extension Ideas:

- Create color wheels using eyedropper art
- Predict what colors will make before mixing
- Use colored water to dye white flowers or celery stalks

03 FLOATING AND SINKING EXPLORATION

Materials:

- Clear tub of water
- Collection of objects that float (cork, plastic toys, foam)
- Collection of objects that sink (rocks, metal spoons, marbles)
- Sorting containers
- Towels for spills
- Recording sheets (optional)

Instructions:

1. Fill a clear tub with water
2. Introduce vocabulary: "float" and "sink"
3. Demonstrate with one floating and one sinking object
4. Allow children to test objects and sort them by whether they float or sink
5. Ask children to make predictions before testing

Learning Objectives:

- Understand basic physics concepts
- Make and test predictions
- Develop observation skills

Observation Prompts:

- "What do you notice about objects that float?"
- "Why do you think this object sinks?"
- "Can you find another object that you think will float/sink?"

Extension Ideas:

- Try changing the shape of play dough to make it float
- Test if the same object behaves differently in salt water
- Sort objects by material before testing

BUBBLE SOLUTION EXPERIMENT 04

Materials:

- Dish soap
- Water
- Glycerin or corn syrup (optional, makes stronger bubbles)
- Various bubble wands or pipe cleaners bent into shapes
- Shallow containers
- Measuring cups and spoons

Instructions:

1. Create basic bubble solution (1 part dish soap to 4 parts water)
2. Let children experiment with different bubble wands
3. Test different solutions (more soap, added glycerin)
4. Compare which makes the biggest or longest-lasting bubbles

Learning Objectives:

- Experiment with variables
- Observe properties of bubbles
- Practice comparative language

Observation Prompts:

- "What shape are the bubbles?"
- "What happens when bubbles touch each other?"
- "Which solution makes the best bubbles? How do you know?"

Extension Ideas:

- Create bubble art by blowing colored bubbles onto paper
- Test different bubble wands to see which creates the most bubbles
- Explore other bubble recipes with different ingredients

NATURE SORTING COLLECTION 05

Materials:

- Collection of natural materials (leaves, rocks, sticks, etc.)
- Sorting trays or egg cartons
- Magnifying glasses
- Paper and markers to create labels
- Digital camera (optional)

Instructions:

1. Take children outside to collect natural materials
2. Bring materials inside for closer examination
3. Provide sorting trays and encourage classification
4. Help children identify attributes for sorting (color, size, texture)
5. Create simple labels or take photos of sorted groups

Learning Objectives:

- Develop classification skills
- Learn natural science vocabulary
- Practice descriptive language

Observation Prompts:

- "How are these leaves the same? How are they different?"
- "What words can we use to describe this rock?"
- "Can you find another way to sort these items?"

Extension Ideas:

- Create nature collages with collected materials
- Chart and graph attributes (e.g., number of smooth vs. rough rocks)
- Create observational drawings of favorite items

INTERMEDIATE ACTIVITIES

BAKING SODA VOLCANO REACTIONS 06

Materials:

- Baking soda
- Vinegar
- Food coloring
- Dish soap (optional, creates more dramatic foam)
- Small containers or prepared "volcano" from clay or playdough
- Eyedroppers or small cups
- Trays to contain mess

Instructions:

1. Create volcano base or use small containers
2. Fill with 1-2 tablespoons baking soda
3. Add a few drops of food coloring and dish soap to baking soda
4. Have children add vinegar with eyedroppers or small cups
5. Observe the fizzing chemical reaction

Learning Objectives:

- Understand chemical reactions
- Observe cause and effect
- Practice estimation and measurement

Observation Prompts:

- "What happens when you add vinegar to baking soda?"
- "What do you notice about the bubbles?"
- "What happens if we use more or less vinegar?"

Extension Ideas:

- Try different amounts of baking soda or vinegar
- Add glitter for "sparkle eruptions"
- Compare reactions with warm vs. cold vinegar

RAMPS AND PATHWAYS 07

Materials:

- Various ramp materials (cardboard, wooden boards, plastic gutters)
- Blocks or books to prop up ramps
- Collection of rolling objects (marbles, cars, balls of different sizes)
- Measuring tape
- Masking tape to mark distances

Instructions:

1. Set up a simple ramp with one incline
2. Demonstrate how objects roll down ramps
3. Encourage children to experiment with different ramp heights
4. Mark distances that objects travel with tape
5. Compare which objects roll farthest

Learning Objectives:

- Introduce concepts of force, motion, and gravity
- Practice making predictions
- Develop spatial reasoning

Observation Prompts:

- "What happens when we make the ramp steeper?"
- "Why do you think this ball went farther than that one?"
- "How could we make the car go even farther?"

Extension Ideas:

- Create obstacle courses with multiple ramps and tunnels
- Test different surfaces (carpet, tile) under the landing area
- Graph distances traveled by different objects

MAGIC MILK COLOR EXPLOSION 08

Materials:

- Shallow dishes or trays
- Whole milk (works better than skim)
- Food coloring (various colors)
- Dish soap
- Cotton swabs
- Eyedroppers

Instructions:

1. Pour milk into shallow dishes (about 1/2 inch deep)
2. Add drops of different food colors spread out on the surface
3. Dip cotton swab in dish soap
4. Touch the soap-dipped swab to the milk's surface
5. Watch colors swirl and move away from the soap

Learning Objectives:

- Observe surface tension
- Learn about molecular interactions
- Explore color mixing

Observation Prompts:

- "What happens when the soap touches the milk?"
- "Why do you think the colors move away from the soap?"
- "What new colors are being created as they mix?"

Extension Ideas:

- Try with different types of milk (skim, 2%, heavy cream)
- Use different types of soap to compare results
- Create milk art by carefully placing drops of soap

MARSHMALLOW AND TOOTHPICK STRUCTURES 09

Materials:

- Mini marshmallows (or playdough balls for less mess)
- Toothpicks
- Photos of simple structures for inspiration
- Paper to sketch designs
- Rulers (optional)

Instructions:

1. Demonstrate how to connect marshmallows using toothpicks
2. Start with simple shapes like squares and triangles
3. Challenge children to build 3D structures
4. Test the strength of different shapes
5. Display completed structures

Learning Objectives:

- Understand stability and strength in structures
- Develop fine motor skills
- Practice spatial reasoning

Observation Prompts:

- "Which shape seems strongest?"
- "How did you make your structure balance?"
- "What happens if we try to build it taller?"

Extension Ideas:

- Build specific structures (houses, towers, bridges)
- Test which designs can hold small weights
- Create group projects with larger shared structures

GROWING CRYSTALS 10

Materials:

- Borax powder (or table salt/Epsom salt for simpler version)
- Hot water (adult preparation)
- String or pipe cleaners
- Pencils or sticks
- Clear jars
- Food coloring (optional)

Instructions:

1. Create pipe cleaner shapes or cut string lengths
2. Adult: Mix hot water and borax (3 tablespoons per cup of water)
3. Add food coloring if desired
4. Suspend shapes in solution using pencils across jar tops
5. Observe crystal formation over 24-48 hours

Learning Objectives:

- Understand dissolving and crystallization
- Practice observation over time
- Learn about solutions and saturation

Observation Prompts:

- "What do you notice about the solution?"
- "How have the crystals changed since yesterday?"
- "Where are the crystals forming?"

Extension Ideas:

- Compare different solutions (salt, sugar, borax)
- Create multicolored crystals by transferring between solutions
- Document growth with daily photos or drawings

ADVANCED ACTIVITIES

PARACHUTE DESIGN CHALLENGE 11

Materials:

- Various lightweight materials (tissue paper, plastic bags, fabric, coffee filters)
- String or yarn
- Small weights (washers, paper clips, small toys)
- Scissors
- Tape or glue
- Stopwatch
- Measuring tape

Instructions:

1. Discuss how parachutes work
2. Show basic parachute design
3. Challenge children to create parachutes using different materials
4. Test by dropping from consistent height
5. Time how long each parachute stays in the air

Learning Objectives:

- Understand air resistance
- Test variables systematically
- Practice measuring time

Observation Prompts:

- "What do you notice about how the parachute falls?"
- "Which material worked best? Why do you think so?"
- "How could we make the parachute fall more slowly?"

Extension Ideas:

- Chart falling times of different designs
- Modify designs to improve performance
- Test different weights with the same parachute

SINK OR FLOAT BOATS 12

Materials:

- Aluminum foil
- Clay or playdough
- Small weights (coins, marbles)
- Tub of water
- Towels for cleanup
- Scale (optional)

Instructions:

1. Give each child a same-sized piece of aluminum foil
2. Challenge them to create boats that float
3. Test designs in water
4. Add weights one by one to see how many each boat can hold
5. Redesign for improved weight capacity

Learning Objectives:

- Understand buoyancy and displacement
- Practice design iteration
- Develop problem-solving skills

Observation Prompts:

- "What shape seems to hold the most weight?"
- "What happens when you change the shape of your boat?"
- "Why do you think this design works better?"

Extension Ideas:

- Compare foil boats to other materials
- Create boats with sails that move with "wind" (from blowing)
- Hold a boat design competition

SHADOW INVESTIGATION 13

Materials:

- Flashlights
- Various objects of different shapes
- White paper or wall for projecting shadows
- Colored cellophane or transparent materials
- Tracing paper and markers (optional)

Instructions:

1. Darken the room partially
2. Demonstrate how to create shadows with flashlight and objects
3. Investigate how changing distance affects shadow size
4. Experiment with multiple light sources
5. Try creating shadow puppets or scenes

Learning Objectives:

- Understand how light travels
- Learn about transparency and opacity
- Observe patterns and relationships

Observation Prompts:

- "What happens to the shadow when you move the light closer?"
- "Why does this object make a clear/fuzzy shadow?"
- "How can we make the shadow bigger/smaller?"

Extension Ideas:

- Trace shadows at different distances
- Create shadow art with interesting shapes
- Use colored filters to explore colored shadows

WATER CYCLE IN A BAG 14

Materials:

- Ziplock bags (gallon size)
- Blue food coloring or watercolors
- Hot water (warm, not boiling)
- Permanent markers
- Tape for hanging bags

Instructions:

1. Draw a simple landscape (hills, sun) on the bag
2. Add warm water with blue coloring (about 1/4 cup)
3. Seal bag carefully, removing excess air
4. Tape to a sunny window
5. Observe throughout the day as water evaporates and condenses

Learning Objectives:

- Understand water cycle concepts
- Observe states of matter
- Develop vocabulary related to water cycle

Observation Prompts:

- "What's happening to the water at the bottom of the bag?"
- "Where do you see water droplets forming?"
- "How is this like the real water cycle outside?"

Extension Ideas:

- Create a class water cycle chart
- Compare bags in sunny vs. shady windows
- Add salt to water in some bags to see effect on evaporation

CODING WITH GRID PATHS 15

Materials:

- Large grid drawn on paper or taped on floor
- Direction cards with arrows
- Small toy or figure to move
- Target destination markers
- Paper and pencils for recording paths

Instructions:

1. Set up grid with start and end points
2. Demonstrate how to move using direction cards
3. Have children create a sequence of directions
4. Test sequence by moving toy according to instructions
5. Debug any errors and revise

Learning Objectives:

- Develop basic coding concepts
- Practice sequential thinking
- Work on spatial orientation

Observation Prompts:

- "What direction do we need to go next?"
- "How many steps will it take to reach the target?"
- "Where did our instructions go wrong? How can we fix it?"

Extension Ideas:

- Add obstacles to navigate around
- Create longer, multi-step paths
- Have children create their own direction symbols

OBSERVATION TEMPLATE

Use this template to document children's engagement with STEM activities:

Activity Name: **Date:** **Children Participating:** **Questions Children Asked:**

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-
-
-

Observations Made by Children:

-
-
-
-

Vocabulary Used:

-
-
-
-

Challenges Encountered:

-
-
-
-

Next Steps to Extend Learning:

-
-
-
-

Photos/Documentation: (Attach or describe)

TIPS FOR SUCCESSFUL STEM IMPLEMENTATION

1. **Start small** - Begin with one activity per week
2. **Follow children's interests** - Observe what excites them
3. **Ask open-ended questions** - Encourage thinking rather than correct answers
4. **Document learning** - Take photos and notes about children's discoveries
5. **Involve families** - Share activities and ask for recycled materials
6. **Expect mess** - Prepare for it with proper materials and cleanup routines
7. **Be enthusiastic** - Your excitement is contagious
8. **Connect to books** - Pair activities with related stories
9. **Repeat activities** - Children benefit from multiple exposures
10. **Celebrate process** - Focus on exploration rather than perfect results