Bathroom Science Experiments

Fun Scientific Discoveries Using Bathroom Items for Ages 5-10

Introduction

Welcome to our Bathroom Science Experiments guide! Just like the kitchen, your bathroom is filled with opportunities for scientific discovery. These experiments use safe, common bathroom items to explore fascinating scientific concepts in a space where a little mess is easy to clean up. Each activity is designed to spark curiosity while creating memorable learning experiences for children ages 5-10.

What you'll find in this guide:

- 6 engaging bathroom science experiments with detailed instructions
- Materials lists featuring everyday bathroom items
- Age-appropriate scientific explanations
- Discussion questions to deepen understanding
- Extension ideas for continued exploration

Why Bathroom Science?

The bathroom provides unique materials and conditions for science experiments:

- Water-friendly environment easy for cleanup
- Access to water, soap, and other interesting substances
- Mirrors and other reflective surfaces for light experiments
- The opportunity to make science part of daily routines
- A space designed to handle splashes and spills

Let's transform ordinary bathroom time into extraordinary learning opportunities!

Experiment 1: Foaming Hand Wash

Materials:

- Baking soda
- Liquid hand soap
- Small cup or bowl
- Food coloring (optional)
- Vinegar
- Spoon for stirring

Time required: 15 minutes

Safety notes: Adult supervision recommended. Don't get the mixture in eyes.

Instructions:

1. Place 2 tablespoons of baking soda in the cup or bowl.
2. Add 1 tablespoon of liquid hand soap and stir well.
3. Add a drop or two of food coloring if desired.
4. Slowly pour in 1 tablespoon of vinegar and watch what happens!
5. Add more vinegar in small amounts to continue the reaction.

What's Happening?

This experiment demonstrates an acid-base reaction. The baking soda (sodium bicarbonate) is a base, while vinegar (acetic acid) is an acid. When they mix, they create carbon dioxide gas, which gets trapped in the soap to create lots of foam and bubbles. This is similar to how some bath bombs work!

Questions to Ask:

- What do you notice about the bubbles?
- What sounds do you hear during the reaction?
- What happens if you add more vinegar? More baking soda?
- How is this similar to or different from other bubbles you've seen?

Extension Activity:

Try changing the amounts of each ingredient and record how it affects the foaming reaction. Can you create a formula for the biggest foam explosion?

Experiment 2: Dissolving Mystery

Materials:

- 4 clear cups or glasses
- Warm water
- Table salt
- Epsom salt (found in many bathroom cabinets)
- Sugar
- Spoons for stirring
- Magnifying glass (optional)

Time required: 20 minutes

Safety notes: Safe for all ages with adult supervision. Materials not for consumption after experiment.

Instructions:

1. Fill each cup halfway with warm water.
2. In the first cup, add 1 tablespoon of table salt.
3. In the second cup, add 1 tablespoon of Epsom salt.
4. In the third cup, add 1 tablespoon of sugar.
5. Leave the fourth cup with just water as a control.
6. Stir each cup for the same amount of time (about 20 seconds).
7. Observe which substances dissolve fastest and which take longest.
8. If you have a magnifying glass, examine any undissolved particles.

What's Happening?

Different substances dissolve at different rates because of their chemical composition and crystal structure. When something dissolves, its particles break apart and mix with the water

molecules. Temperature also affects dissolving rates—typically, warmer water can dissolve substances faster than cold water.

Questions to Ask:

- Which substance dissolved the fastest? The slowest?
- What happened to the water's appearance as each substance dissolved?
- What do you think would happen if we used cold water instead?
- Why might dissolving be important in everyday life?

Extension Activity:

Repeat the experiment with cold water and compare the dissolving times. Create a chart showing the difference in dissolving rates between warm and cold water for each substance.

Experiment 3: Magic Color-Changing Cabbage Indicator

Materials:

- Red cabbage (can be prepared in kitchen)
- Hot water
- Clear containers
- Various bathroom items to test:
    - Baking soda (mixed with water)
    - Toothpaste
    - Shampoo
    - Soap
    - Vinegar
    - Mouthwash
- Spoons for stirring
- Dropper or spoon

Time required: 30 minutes for preparation, 20 minutes for experiment

Safety notes: Adult help needed for hot water. Keep solution away from eyes.

Instructions:

Prepare the cabbage indicator:

1. Have an adult help chop ¼ of a red cabbage and place in a bowl.
2. Add 2 cups of hot water and let it sit for 10 minutes.
3. Strain out the cabbage pieces, keeping the purple liquid.
4. Let the liquid cool before using.

For the experiment:

1. Pour a small amount of cabbage indicator into several clear containers.
2. Add a small amount (about ½ teaspoon) of each bathroom item to a different container of indicator solution.
3. Stir and observe any color changes.
4. Record the color changes for each substance.

What's Happening?

Red cabbage contains a natural pH indicator that changes color depending on whether a substance is an acid or a base. Acids turn the cabbage juice red or pink, while bases turn it blue, green, or yellow. This experiment helps us categorize everyday items as acids or bases based on their chemical properties.

Color Guide:

- Red/Pink = Strong acid
- Purple = Neutral
- Blue/Green/Yellow = Base (stronger bases create greener/yellower colors)

Questions to Ask:

- Which items changed the color the most dramatically?
- Can you group the items into acids and bases?
- Were there any surprising results?
- Why might it be important to know if something is an acid or a base?

Extension Activity:

Create a pH rainbow by arranging your test containers from most acidic to most basic according to their colors. Try testing other items from around your house.

Experiment 4: Splendid Soap Boat

Materials:

- Shallow container filled with water (bathtub, sink, or large bowl)
- Cardboard or thin cardstock
- Scissors
- Liquid soap or dish soap
- Toothpick

Time required: 15 minutes

Safety notes: Safe for all ages with adult supervision for using scissors.

Instructions:

1. Cut a small boat shape (about 2-3 inches long) out of cardboard.
2. Cut a small notch in the back of the boat (like a letter "V").
3. Fill your container with water.
4. Gently place the boat on the water surface.
5. Dip the toothpick in liquid soap.
6. Touch the soap-covered toothpick to the water in the notch at the back of the boat.
7. Watch as your boat zooms forward!

What's Happening?

This experiment demonstrates surface tension. Water molecules are attracted to each other, creating a kind of "skin" on the water's surface. Soap disrupts this surface tension. When you add soap behind the boat, the surface tension is lowered there, but remains strong in front of the boat. This difference creates a pulling force that propels the boat forward.

Questions to Ask:

- How far did your boat travel?

- What happens if you add more soap? Less soap?
- Does the shape of the boat affect how it moves?
- What happens if you try this in a larger body of water like a bathtub?

Extension Activity:

Hold boat races by creating different boat designs. Test which shape travels fastest or farthest. Try to make a boat that can be steered by strategic soap placement.

Experiment 5: Homemade Bath Bombs

Materials:

- ½ cup baking soda
- ¼ cup citric acid (available at grocery stores)
- ¼ cup cornstarch
- ¼ cup Epsom salt
- 2-3 teaspoons water
- 2 teaspoons vegetable oil
- 5-10 drops of food coloring (optional)
- 5-10 drops of essential oil or fragrance (optional)
- Small spray bottle
- Mixing bowl
- Molds (can use muffin tins, ice cube trays, or silicone molds)

Time required: 30 minutes for preparation, 24 hours for drying

Safety notes: Adult supervision required. Keep materials away from eyes.

Instructions:

1. In a bowl, mix all dry ingredients (baking soda, citric acid, cornstarch, and Epsom salt).
2. In the spray bottle, mix the water, oil, food coloring, and fragrance if using.
3. Very slowly spray the liquid mixture into the dry ingredients while stirring continuously.

4. Spray just enough so the mixture holds together when squeezed (like slightly wet sand).
5. Quickly press the mixture into molds.
6. Let dry for 24 hours, then carefully remove from molds.
7. Drop into bathwater and watch the fizzing reaction!

What's Happening?

Bath bombs demonstrate an acid-base reaction. The baking soda (base) and citric acid remain inactive when dry. But when they get wet in the bathtub, they react together to release carbon dioxide gas, creating the fizzing effect. The cornstarch slows the reaction so it lasts longer, while the Epsom salt adds minerals to the water.

Questions to Ask:

- What happens when the bath bomb hits the water?
- What do you notice about the speed of the reaction?
- How do different water temperatures affect the reaction?
- Why do we need to keep the ingredients dry until use?

Extension Activity:

Experiment with different shapes, colors, and scents. Try adding dried flower petals or biodegradable glitter for different effects. Compare how changing the ratio of ingredients affects the fizziness.

Experiment 6: Mirror Fog Writing

Materials:

- Bathroom mirror
- Hot shower to create fog on mirror
- Small bowl of ice water

Time required: 10 minutes

Safety notes: Adult supervision for hot water. Be careful around slippery bathroom floors.

Instructions:

1. Have an adult run a hot shower to steam up the bathroom mirror.
2. Turn off the shower.
3. Write or draw on the foggy mirror with your finger.
4. Watch as your writing disappears as the mirror clears.
5. Place your finger in the ice water for a few seconds.
6. Use your cold finger to write on the cleared mirror.
7. Step back and breathe on the mirror—your writing will reappear!

What's Happening?

This experiment demonstrates condensation and temperature effects. When you write on a foggy mirror, you're removing tiny water droplets. As the mirror dries, your writing disappears. When you use a cold finger on the clear mirror, it cools the glass in that spot. Later, when you breathe warm, moist air onto the mirror, water vapor condenses more quickly on the cooler areas where you wrote, making your invisible writing visible again!

Questions to Ask:

- Why does the mirror fog up in the first place?
- What happens to the water droplets when you write on the foggy mirror?
- Why does your cold finger create invisible writing?
- Where else do you see condensation in everyday life?

Extension Activity:

Try writing with different temperature items (ice cube wrapped in plastic, metal spoon kept in freezer) to see which creates the best "invisible ink" effect. Experiment with how long the invisible writing lasts.

Science Skills Development

These bathroom science experiments help children develop key scientific thinking skills:

- **Observation:** Noting changes, colors, movements, and reactions
- **Comparison:** Identifying similarities and differences between materials and reactions
- **Prediction:** Making educated guesses about what will happen

- **Experimentation:** Changing variables to see how they affect outcomes
- **Measurement:** Understanding quantities and their effects
- **Documentation:** Recording results and observations

Tips for Parents

- Schedule bathroom science during a time when you don't need to rush
- Lay down towels to make cleanup easier
- Use this as an opportunity to discuss water conservation
- Connect experiments to bathtime routines when possible
- Encourage questions and "what if" scenarios
- Take photos of experiments in progress (great for science journals!)

More Resources

For more science fun, check out these other resources on our Parent Resource Hub:

- Kitchen Science Experiments
- Outdoor Nature Explorations
- Science Journaling for Kids

Share Your Experiments!

We'd love to see your bathroom science in action! Share photos of your experiments on social media with the hashtag #EduRecodedScience or email them to community@educationrecoded.org.

Remember, building scientific thinking skills starts with curiosity and exploration. These simple activities lay a foundation for more complex scientific understanding later!


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