WELCOME, EDUCATOR!

You and the children you work with are about to embark on an engaging multimedia experience exploring concepts in Science, Technology, Engineering, and Math (STEM). *Sesame Street Little Discoverers: Big Fun with Science, Math, and More* is a resource to help you discover exciting new ways to build on children's natural fascination with STEM concepts.

In this topic, children will learn about the process of experimentation.

HELP CHILDREN TALK ABOUT EXPERIMENTS:

» An experiment is a test that is set up the same way each time with just one thing changing.

» The goal of an experiment is to try out different ideas to see if a hypothesis is correct.

» Usually an experiment begins by observing something interesting and then asking a question and making a hypothesis. A hypothesis is a thoughtful guess or possible explanation for why something happens.

» Next comes recording (writing down) and analyzing (considering) the findings. Recording and analyzing results allow people to look at data and decide what it may mean.

» After reviewing results, it’s time to make a conclusion based on the evidence.

» Last, it’s time for reporting the findings, because the results can help make decisions.

**KEY VOCABULARY**

*analyzing*: considering information gathered during an experiment

*conclusion*: a summary of what you know based on the results

*evidence*: the data gathered during an experiment

*experiment*: a fair test that is set up the same way each time except for one change to determine if what you change is the cause of something

*fair test*: an experiment

*hypothesis*: a thoughtful guess or possible explanation for why something happens

*investigating*: gathering information by observing or testing

*observing*: using our senses to gather information

*recording*: writing down an experiment’s data and results

*reflecting*: considering observations about the experiment

*reporting*: telling others about the experiment

For more fun ideas, videos, and games, check out sesamestreet.org/STEM on your computer or mobile device.
EXPERIMENTS

Don’t Pop the Bubbles

GOAL
Learn how to plan and conduct an experiment.

QUESTION
Which materials can bubbles land on without popping?

TIME
15–30 minutes

MATERIALS
» bubble solution
» bubble wand
» 1 piece of newspaper per child
» 1 piece of wax paper (or plastic freezer bag) per child
» View and Do Chart
» crayons

WATCH “MURRAY EXPERIMENT: BUBBLES”
In the video, Murray observes that bubbles keep popping when he tries to catch them. The teacher suggests setting up an experiment to determine if adding something to your hands can help catch a bubble without it popping. The children and Murray test five different conditions: wet hands, soapy hands, dirty hands, garden gloves, and aluminum foil. They discover that some conditions do allow them to ‘catch’ a bubble without it popping.

LET’S TALK ABOUT IT
After you watch the video together, ask some questions to prompt a discussion.

» “Murray made an observation in the beginning of the video. What did he observe?”
» “In the experiment, what did Murray and the children change?”
» “Which conditions allowed the children to catch the bubbles without popping? Why do you think these conditions worked?”

LET’S DO AN ACTIVITY
1. Say, “Let’s do our own experiment to see what material the bubbles can land on without popping. Let’s look at our materials: We have newspaper and wax paper.”
2. Pass out the two materials and ask children to observe them.
3. Say, “Now that you’ve seen both materials, let’s make a hypothesis. Raise your hand if you think the bubbles can land on the newspaper without popping. Raise your hand if you think the bubbles can land on the wax paper without popping.”
4. Tally the results, and write down the hypothesis with the most votes.
5. Start with the newspaper. Blow bubbles and have children try to get the bubbles to land on the newspaper.
6. Tally the number of bubbles that stay on the newspaper without popping.
7. Switch materials and tally the number of bubbles that stay on the wax paper without popping.
8. Compare the two sets of data. Then ask, “Which material was the best for catching bubbles without popping?” Have children share the results using the sentence starter, “Our experiment showed __________, because __________.”

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**EXPERIMENTS**

**Don’t Pop the Bubbles**

Have children write or draw the materials in the boxes and record their hypothesis on the line below. Put a tally mark under the material name each time a bubble lands on that material without popping. After children analyze the data, help them write down the results.

**Our hypothesis:** We think ____________________________ won’t make the bubbles pop.

<table>
<thead>
<tr>
<th>Material 1</th>
<th>Material 2</th>
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<tbody>
<tr>
<td>Bubbles landed without popping</td>
<td>Bubbles landed without popping</td>
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</table>

**Our results:** ____________________________ was the best for catching bubbles, because ____________________________

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Major support provided by CA Technologies. Generous support provided by the S. D. Bechtel, Jr. Foundation and the Heising-Simons Foundation.
EXPERIMENTS

Growing Seeds

In this activity, children do an experiment to see whether plants need water to grow.

GOAL
Develop the skills of planning and conducting an experiment.

QUESTION
Do seeds need water to grow?

TIME
40 minutes to set up the experiment, and 15-minute sessions over the course of two weeks to observe and record any growth.

MATERIALS
For each child (or group):
» 2 seeds (bean, wheat, or grass seed)
» 2 clear plastic cups
» Activity Chart
» crayons

For the class:
» pitcher of water
» bag of potting soil

STEPS
1. Allow students to observe a seed: What does it look like? What does it feel like?
2. Have the students share their experiences planting a seed and where they have seen plants sprouting from seeds.
3. Then ask, “What do you think this seed needs to grow into a plant?” Discuss together. (If “water” is not one of the answers, say, “I usually see people watering plants. I’m going to add that I think they need water to grow.”)
4. Introduce the experiment: “We’re going to do an experiment to see if our seeds will grow better with water or without water. We’ll give some of our seeds water and the other seeds no water.
5. Guide children to make a hypothesis about what they think will happen to the seeds. For example, “The seeds with water will grow tall. The seeds without water will be short.”
6. Help children plant the seeds: Have each child take two cups and poke a small hole in the bottom of each for drainage. Fill the cups with potting soil, then push the seeds approximately 3 inches into the soil. For the Water group, water the seeds every few days.
7. Have the children place one of their seeds in the Water spot, and the other in the No Water spot.
8. Have children observe the seeds four times over the next two weeks to collect and record data. Provide each child with an Activity Chart and crayons to draw what they see.
9. Look at the charts together to talk about and analyze the data. Ask:
   » What did the seeds in each group look like at the end of the experiment?
   » Did our hypothesis match what we saw?
   » What did we learn from our experiment? Did the seeds need water to grow?
EXPERIMENTS

Growing Seeds

Have children use this chart to make a hypothesis, collect data, and record results. For each day that data is recorded, write down the day and draw a picture in each column.

Our hypothesis:
The seeds with water will ________________________________.
The seeds without water will ________________________________.

<table>
<thead>
<tr>
<th>Day</th>
<th>Water</th>
<th>No Water</th>
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Our Results:
We found out that ____________________________________________.
Hello, Families!

Your child is full of curiosity. She is always observing, questioning, testing her thinking, and collecting information. These are important critical-thinking and problem-solving skills that help set her up for success in Science, Technology, Engineering, and Math (STEM).

Help Your Child Talk About Experiments

» An experiment is a test that is set up to answer a question.

» An experiment includes making careful observations. Encourage your child to use “I notice…” and “I wonder…” statements about what she sees around her.

» A hypothesis is an explanation of why something might be happening. When your child guesses what might be causing something to happen, she is making a hypothesis. Ask, “Why do you think that’s happening?”

» Your child can collect data, or information, by drawing or writing down what she sees.

» Counting and comparing will help her analyze the results of her experiment.

Try This at Home

Pick and choose the activities that work best for you and your child.

Let’s Talk. Use these phrases, which foster the kind of thinking used in experiments, as many times as you can this week: “I wonder…,” “I think _______ because _________,” “I notice….” Give a high-five anytime someone in the family uses these phrases.

Change the Colors. Explore mixing paint colors. Start with two red spots of paint. How does adding blue to one and yellow to another, change the color?

Test Products. Test two products against each other. For example, experiment to see which cleans up a spill better: paper towels or tissues; or experiment to see which utensil is better to eat cereal with: a spoon or a fork.

Explore Water. Experiment by pouring water onto different outdoor surfaces, such as grass, dirt, cement, or brick. Which surfaces absorb the water and which do not?

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EXPERIMENTS

Observe, Record, Sprout!

TUBE EXPLORATION
Use paper towel tubes to explore experiments. Talk about what a tube and ball can do (roll). Test which is a better roller: a ball or a tube.

WATCH “OBSERVE, RECORD, ANNOY”
In the video, Oscar investigates the question, “What do worms like to squirm on the best?” He sets up an experiment where he observes and records what he discovers. He concludes worms like to squirm on olive oil best.

ACTIVITY
In this investigation, help your child develop the scientific process of observing and recording. Remember, you do not need to know all the answers. Enjoy exploring with your child.

MATERIALS
» plastic sandwich bag
» 4–6 lima beans
» Activity Chart
» paper towels
» water
» crayons

STEPS
1. Help your child write the date and draw a picture of the lima bean on the Activity Chart.
2. Help your child wrap one set of lima beans in a damp paper towel and the other set in a dry paper towel.
3. Put the paper towels with the lima beans inside plastic sandwich bags and seal them tightly.
4. Have your child think about what will happen to the bean.
5. Observe the bean every day and record your observations. Replace the paper towel with a damp towel if it dries. The beans should sprout within 2-3 days.
6. Talk to your child about what plants need to grow. Some plants, like the lima bean, just need water to grow while other plants need soil as well. If your child hypothesizes that the beans would not grow in soil or would grow better in soil, try it out!

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**Observe, Record, Sprout!**

Have your child record her observations by drawing the bean on different days.

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