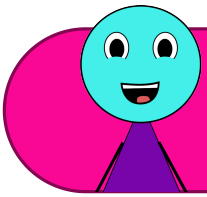


STEM & STEAM

Activities by Age Group

Ages 4–7 (Early Childhood)

Color-Changing Milk

Category: Science
Type: Solo
Skills: Observation, color mixing
Materials: Shallow dish, whole milk, food coloring, dish soap, cotton swab

Instructions:

1. Pour a thin layer of milk into the dish.
2. Add 3–4 drops of different food coloring around the surface.
3. Dip a cotton swab into dish soap.
4. Touch the soapy swab to the milk's surface and watch the colors burst outward.
5. Repeat in different spots and observe how the reaction changes.
6. Why it works: Soap breaks surface tension and pushes the fat molecules around, creating swirling color movement.

Watercolor Mixing Lab

Category: Art
Type: Solo
Skills: Color theory, creativity
Materials: Watercolors, brush, paper, salt (optional)

Instructions:

1. Paint a wet patch on the paper.
2. Add drops of different colors and watch them blend.
3. Sprinkle salt on wet paint to create star-like textures.
4. Let dry and observe patterns.

Tangram Animals

Category: Math
Type: Solo
Skills: Spatial reasoning
Materials: Tangram set

Instructions:

1. Lay out all seven shapes.
2. Try to form animals like cats, birds, or fish.
3. Use all pieces without overlapping.
4. Draw your finished design.

Ages 8–11 (Middle Childhood)

Crystal Growing

Category: Science
Type: Solo
Skills: Observation, patience
Materials: Jar, hot water, sugar or salt, spoon, string, pencil

Instructions:

1. Heat water until warm (not boiling).
2. Stir in sugar or salt until no more dissolves (a saturated solution).
3. Pour into a jar.
4. Tie a string to a pencil and rest the pencil across the jar opening so the string hangs down.
5. Leave undisturbed for several days.

Weather Journal

Category: Science
Type: Solo
Skills: Data tracking
Materials: Notebook, pencil

Instructions:

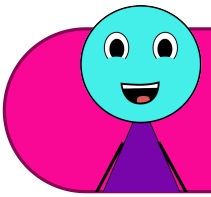
1. Each day, record temperature, cloud type, wind, and precipitation.
2. Add a drawing of the sky.
3. Note your mood and energy level.
4. Look for patterns after a week or month.

Scratch Coding Stories

Category: Technology
Type: Solo
Skills: Logic, storytelling
Materials: Computer with *Scratch*

Instructions:

1. Choose a backdrop and characters.
2. Use motion, sound, and event blocks to create a story.
3. Add dialogue using speech bubbles.
4. Test and refine your animation.



STEM & STEAM

Activities by Age Group

Ages 12–15 (Pre-Teens & Young Teens)

Solar Oven

Category: Science
Type: Solo or Small Group
Skills: Energy, heat transfer
Materials: Pizza box, foil, plastic wrap, black paper

Instructions:

1. Line the inside of the box with foil.
2. Place black paper at the bottom.
3. Cover the opening with plastic wrap to trap heat.
4. Angle the lid to reflect sunlight inside.
5. Place food (like s'mores) inside and monitor temperature.

Build a Simple Website

Category: Technology
Type: Solo
Skills: Coding, design
Materials: Computer, text editor

Instructions:

1. Create an HTML file with a title and headings.
2. Add text about a hobby or interest.
3. Use CSS to change colors and fonts.
4. Add images or links.

Sound Wave Art

Category: Art
Type: Solo
Skills: Visualization
Materials: Audio recorder, printer

Instructions:

1. Record a meaningful sound (voice, music, nature).
2. Use an app to view the waveform.
3. Print the waveform and trace it onto art paper.
4. Add colors, patterns, or textures.

Ages 16–18 (Older Teens)

Water Quality Testing

Category: Science
Type: Solo
Skills: Environmental science
Materials: Test strips, jars, notebook

Instructions:

1. Collect water samples from different sources.
2. Test pH, hardness, and turbidity.
3. Record results in a table.
4. Compare and analyze differences.

Digital Photography Portfolio

Category: Technology
Type: Solo
Skills: Composition, editing
Materials: Camera or phone

Instructions:

1. Choose a theme (patterns, nature, shadows).
2. Take 20–50 photos.
3. Edit for brightness and contrast.
4. Arrange into a digital or printed portfolio.

Arduino Mini Projects

Category: Engineering
Type: Solo
Skills: Circuits, coding
Materials: Arduino kit

Instructions:

1. Connect a simple circuit (LED + resistor).
2. Upload code to blink the LED.
3. Add sensors (light, temperature).
4. Build a small device like a mood lamp.