30-Day STEM Challenge

Fun Daily Activities for Young Learners (Ages 5-10)
By Dallas W. Thompson, PhD

Welcome to the 30-Day STEM Challenge!

This resource provides one engaging STEM activity for each day of the month. Perfect for summer learning, classroom enrichment, or rainy day activities at home! Each challenge uses common household materials and takes 15-45 minutes to complete.

How to Use This Guide:

- Activities are designed to be completed independently by children ages 7-10, or with adult support for ages 5-6
- Materials needed are listed for each challenge
- No special equipment or expensive supplies required
- Challenges can be done in any order
- Encourage creativity—there's no single "right" answer!

Week 1: Building & Engineering

Day 1: Paper Tower Challenge

Goal: Build the tallest tower using only paper and tape
Materials: 10 sheets of paper, tape, ruler
Challenge: Can you make it taller than 12 inches? Try rolling, folding, or layering!

Day 2: Bridge Builder

Goal: Create a bridge that spans 12 inches and holds a toy car
Materials: Cardboard, tape, scissors, toy car
STEM Concept: Engineers must balance strength and weight

Day 3: Marble Run

Goal: Design a path for a marble to roll from start to finish
Materials: Cardboard tubes, tape, marble, cardboard pieces
Challenge: Add at least 3 turns or drops!

Day 4: Straw Structures

Goal: Build a 3D structure using only straws and tape
Materials: 20 drinking straws, tape
Try: Triangles make structures stronger than squares!

Day 5: Egg Drop Protection

Goal: Create a container that protects an egg from a 3-foot drop
Materials: Egg, cotton balls, bubble wrap, tape, cardboard
STEM Concept: Engineers design to absorb impact energy

Day 6: Catapult Creation

Goal: Build a simple catapult that launches a pom-pom
Materials: Popsicle sticks, rubber bands, plastic spoon, pom-pom
Challenge: How far can you launch it?

Day 7: Boat That Floats

Goal: Design a boat from aluminum foil that holds the most pennies
Materials: Aluminum foil (12-inch square), pennies, water container
STEM Concept: Shape affects buoyancy!

Week 2: Coding & Logic

Day 8: Unplugged Coding

Goal: Create a “program” to move from one room to another
Materials: Paper, pencil
Instructions: Write step-by-step directions (forward 5 steps, turn right, etc.)

Day 9: Pattern Detective

Goal: Create and extend patterns using household objects
Materials: Buttons, coins, toys, or colored paper
Challenge: Make an AB, ABB, and ABC pattern

Day 10: Algorithm Recipes

Goal: Write an algorithm (step-by-step instructions) for making a sandwich
Materials: Paper, pencil
STEM Concept: Computers need precise instructions!

Day 11: Binary Bracelets

Goal: Create a bracelet using binary code to spell your name
Materials: Beads (2 colors), string
Code: A=00001, B=00010, etc. (Use online binary chart)

Day 12: Maze Maker

Goal: Design a maze and write directions to solve it
Materials: Paper, pencil, small toy
Challenge: Can someone else follow your directions?

Day 13: Sorting Challenge

Goal: Sort a collection of objects by multiple attributes
Materials: Mixed buttons, toys, or household items
STEM Concept: Computers sort data using algorithms

Day 14: Conditional Statements Game

Goal: Play “If-Then” game with family
Example: “If it’s raining, then bring an umbrella”
STEM Concept: Computers use conditional logic

Week 3: Science Experiments

Day 15: Sink or Float Predictions

Goal: Predict which objects will sink or float, then test
Materials: Water container, various household objects
STEM Concept: Density determines buoyancy

Day 16: Color Mixing Science

Goal: Discover what happens when you mix primary colors
Materials: Red, yellow, blue food coloring, water, clear cups
Challenge: Can you make purple, orange, and green?

Day 17: Static Electricity Magic

Goal: Use a balloon to pick up small pieces of paper
Materials: Balloon, small paper pieces, wool cloth
STEM Concept: Rubbing creates electric charge

Day 18: Plant Growth Observation

Goal: Start growing a bean plant and observe daily
Materials: Bean seed, clear cup, soil, water
Challenge: Measure growth each day for 2 weeks

Day 19: Ice Melting Race

Goal: Test which material keeps ice frozen longest
Materials: Ice cubes, aluminum foil, paper towel, plastic bag

STEM Concept: Insulators slow heat transfer

Day 20: Volcano Eruption

Goal: Create a chemical reaction “volcano”
Materials: Baking soda, vinegar, dish soap, food coloring, container
STEM Concept: Acid + base = gas production

Day 21: Shadow Science

Goal: Trace shadows at different times of day
Materials: Sidewalk chalk, sunny day, object
STEM Concept: Earth’s rotation changes sun position

Week 4: Math & Measurement

Day 22: Measurement Scavenger Hunt

Goal: Find objects that are exactly 6 inches long
Materials: Ruler
Challenge: Find 5 objects! Estimate first, then measure

Day 23: Shape Hunt

Goal: Find and photograph 10 different shapes in your home
Materials: Camera or paper and pencil
Look for: Circles, squares, triangles, rectangles, hexagons

Day 24: Estimation Station

Goal: Estimate how many items fill a container, then count
Materials: Container, small objects (beans, pennies, etc.)
STEM Concept: Estimation is an important math skill

Day 25: Symmetry Art

Goal: Create symmetrical art using paint and paper folding
Materials: Paper, paint
Method: Paint on one half, fold, press, open!

Day 26: Graphing Favorites

Goal: Survey family about favorites and create a bar graph
Materials: Paper, pencil, colored pencils
Ideas: Favorite color, food, animal, or season

Day 27: Fraction Pizza

Goal: Draw a pizza and divide it into fractions
Materials: Paper, colored pencils
Challenge: Show $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$

Day 28: Measurement Olympics

Goal: Measure how far you can jump, throw, or reach
Materials: Tape measure, ball, tape to mark spots
STEM Concept: Data collection and comparison

Days 29-30: Grand Finale Projects

Day 29: Rube Goldberg Machine

Goal: Create a chain reaction using household items
Materials: Dominoes, books, balls, ramps, anything!
Challenge: Make at least 5 steps happen in sequence

Day 30: STEM Showcase

Goal: Choose your favorite challenge from the month and improve it
Challenge: Present your creation to family or friends

Reflection: What did you learn? What would you change?

Tips for Success

For Parents & Teachers:

- Allow children to struggle and problem-solve—don't rush to help!
- Ask open-ended questions: "What do you think will happen?" "Why did that work?"
- Celebrate effort and creativity, not just "correct" answers
- Take photos to document the learning journey
- Encourage children to explain their thinking

For Kids:

- It's okay if things don't work the first time—engineers try many times!
- Draw your plans before you build
- Ask questions and be curious
- Have fun and be creative!

Extension Ideas

Keep a STEM Journal:

- Draw pictures of your creations
- Write what worked and what didn't
- Record new questions you have

Share Your Work:

- Take photos and share with family
- Teach someone else how to do a challenge
- Create a video explaining your favorite project

Go Deeper:

- Research the science behind your favorite challenge
- Try the challenge again with different materials
- Invent your own STEM challenge!

STEM Vocabulary

Engineering: Designing and building things to solve problems
Algorithm: Step-by-step instructions
Hypothesis: A prediction you can test
Variable: Something that can change in an experiment
Data: Information you collect
Prototype: A first version you test and improve
Symmetry: When both sides match exactly
Buoyancy: The ability to float

Certificate of Completion

Congratulations!

[**Child's Name**] has completed the 30-Day STEM Challenge!

You showed:

- **Creativity** in designing solutions
- **Perseverance** when facing challenges
- **Curiosity** about how things work
- **Problem-Solving** skills

Keep exploring, building, and learning!

Date: _____

Additional Resources

Want More STEM Fun?

- Visit dallaswthompson.com for more free resources
- Check out “Zara’s Robot Friend” and “Lilypad and the Quest for the Glimmering Gears”
- Explore Code.org for free coding activities
- Visit your local library’s maker space

About the Author

Dallas W. Thompson, PhD, creates STEM resources and children’s books that inspire curiosity and creativity. His mission is to make science, technology, engineering, and math accessible and fun for all learners.

Download more free STEM resources at dallaswthompson.com/teacher-resources