**STEM Club**

**New Springs Schools**

**1. Smart Greenhouse Project**

* Build a small greenhouse with sensors to monitor temperature, humidity, and soil moisture.
* Integrate coding with microcontrollers (Arduino/Raspberry Pi) for automated watering and climate control.

**2. Renewable Energy Challenge**

* Have students design and test their own wind turbines or solar-powered devices.
* They can compete to see who generates the most energy with their design.

**3. Eco-Friendly Water Filter**

* Students design and build a simple water filtration system using natural materials.
* Test different materials to see which cleans water most effectively.

**4. DIY Hydraulic Arm**

* Create a robotic arm using syringes and tubing to demonstrate hydraulic systems.
* Relate it to real-world engineering applications like construction and robotics.

**5. Balloon-Powered Car Race**

* Design and build small cars powered by balloons.
* Experiment with different materials and structures to optimize speed and distance.

**6. Egg Drop Challenge – Engineering Edition**

* Students design protective containers for eggs and test them by dropping them from different heights.
* Use principles of physics and engineering to absorb impact.

**7. Coding a Simple Video Game**

* Use Scratch, Python, or another beginner-friendly programming language to create a game.
* Encourage students to add elements related to STEM topics like space exploration or environmental conservation.

**8. Biodegradable Plastics Experiment**

* Make plastic-like materials using cornstarch and other biodegradable ingredients.
* Test their strength and decomposition over time.

**9. DIY Hovercraft**

* Build a simple hovercraft using balloons, CDs, and small motors.
* Teach students about air pressure and friction.

**10. Bridge-Building Competition**

* Students design and build bridges using popsicle sticks, straws, or other materials.
* Test for strength and efficiency under different weights.

**Engineering & Physics Projects**

1. **Marble Roller Coaster**
   * Build a track using foam tubing or cardboard and test how gravity and momentum affect speed.
2. **Pasta Tower Challenge**
   * Use spaghetti and marshmallows (or hot glue) to build the tallest, strongest tower.
3. **Propeller-Powered Boat**
   * Construct small boats with rubber band-powered propellers and test them in water.
4. **Cardboard Hydraulic Lift**
   * Create a mini scissor lift using syringes and water to explore hydraulics.
5. **Spinning Paper Helicopters**
   * Cut paper into helicopter shapes and drop them to test how wing shapes affect descent.

**Chemistry & Material Science Projects**

1. **Oobleck and Non-Newtonian Fluids**
   * Explore the strange properties of cornstarch and water mixtures.
2. **DIY Bouncy Ball**
   * Make rubber-like balls from glue, cornstarch, and borax.
3. **Exploding Soap (Microwave Ivory Soap Experiment)**
   * Heat Ivory soap in a microwave to see how gases expand.
4. **Chromatography Art**
   * Separate colors in markers using coffee filters and water.
5. **Glow-in-the-Dark Chemistry**
   * Create glowing liquids using tonic water and UV lights.

**Biology & Environmental Science Projects**

1. **Mini Ecosystem in a Bottle**
   * Build a closed terrarium or aquatic ecosystem to observe cycles of life.
2. **Solar-Powered Desalination**
   * Purify saltwater using a simple solar still.
3. **Leaf Chromatography**
   * Extract pigments from leaves to explore plant photosynthesis.
4. **DIY Biodegradable Seed Paper**
   * Create paper embedded with seeds that can be planted in the ground.
5. **Testing Acid Rain Effects**
   * Simulate acid rain with vinegar and test its effects on plants or materials.

**Technology & Coding Projects**

1. **Simple Flashlight Circuit**
   * Build a working flashlight using LED lights, batteries, and conductive materials.
2. **Paper Circuit Art**
   * Use copper tape and LEDs to create light-up greeting cards.
3. **Build a Simple Robot (Brushbot)**
   * Attach a vibrating motor to a toothbrush head to create a tiny robot.
4. **Stop-Motion Animation with Science Concepts**
   * Use a tablet to create short stop-motion films demonstrating physics concepts.
5. **Virtual Reality with Google Cardboard**
   * Have students create their own virtual worlds using Google Cardboard.