CHAIN REACTION II

Duration: 15-30 minutes (could last much longer with added prompts)
Institution: COSI
Skill level/Age Level: All Ages
Group size: Varies based on materials and facilitators, although is flexible. Seems to work well with both small and large groups.

INTRODUCTION

Participants will use an assortment of items (mainly household items) to complete Rube Goldberg-type challenges.

KEY CONCEPTS AND/OR SUBJECT AREA

Encourage guest to build a device that will complete a task through the use of chain reactions. Using basic physics concepts (inertia, gravity, force, motion) and common items, guests will build Rube Goldberg-type machines.

MATERIALS AND TOOLS

Essential Materials—can utilize an assortment of items; we found the following to be useful:

- Paper towel/toilet paper tubes
- Plastic spoons
- String
- Toy building blocks
- Ping pong balls (to serve as object to be moved by machine)
- Plastic cups
- Tape
- Cut up pool noodles
- Paper clips
- Styrofoam
- Cardboard
- Slinkys
- Popsicle sticks

SET UP

Assemble organized (ideally separate) bins of materials and allow guests to pick materials freely based on given challenge.

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HOW TO OR STEP-BY-STEP

1. When guests enter space, show them the bings of materials with which they can work; organization is helpful
2. Provide guests with a prompt. Can be a variety of things, such as:
    a. Can you build a device that moves a ping-pong ball from the floor to a table?
    b. Can you build a device that allows a ping-pong ball to end where it stops (guest usually move it in a circle, but sometimes back and forth like a swing)?
    c. Can you build a device that will launch a ping-pong ball into the air?

FACILITATION TIPS

- Materials front and center engaged guests. When we arranged materials out of the way in the back, we had to work harder to generate interest in the activity.
- We started with a lot of K'nex pieces available, and while they were popular, it seemed many guests spent the majority of their time experimenting with how they could fit the pieces together. We later switched to more familiar materials, i.e. wood blocks, cardboard, foam pieces, and sting. Guests seemed more engaged in designing a chain reaction component when they were presented with materials that could be used together in intuitive ways, unlike the more modular K'nex.
- Groups found it beneficial to start off on their own, exploring the materials and forming a plan for one component in the Chain Reaction sequence. They came together and worked collaboratively to combine all the elements to complete the challenge.
- Our space had several large round tables, so we adapted some of the prompts to fit the area. One example was challenging participants to get their chain of reactions to encircle the table and return to where it started. We also challenged groups to bridge the gap between tables to continue the chain on another table.

Why this experience?

- This experiment will be a perfect fit for design based learning because it: (1) is open ended (2) works well with both small and large groups (3) requires minimal consumables (depending on how they're used) (4) encourages collaboration

GENERAL FACILITATION TIPS

1. Clean up:
    a. Return all materials to their bins and boxes

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MATERIALS SOURCES

Most materials are easy to acquire. We sourced our staff to get things like toilet paper tubes, toy building blocks, etc.

KEYWORDS

- Engineering
- Chain reaction
- Physics (inertia, gravity, force, motion)
- Collaboration

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