URBAN LIBRARIES COUNCIL

STEM PROGRAM MODEL

STEAMed and Chopped: Using Tween Advisory Groups to Design Programs

Provided by Chicago Public Library (Ill.)

HOW WE STARTED

Concept

A three-week series of themed engineering programs that challenged middle schoolers to address engineering challenges in teams by using common craft supplies.

Challenge difficulty and activities were informed by advisory groups of tweens. The challenges were designed to "gamify" activities and increased participant excitement by providing materials for the challenges in mystery boxes.

Goals

Participating youth will:

- Increase understanding and interest in STEM topics in the real world and excitement for exploring further opportunities.
- Develop 21st-century learning skills such as collaboration, problem solving and critical thinking.
- Reflect upon and articulate what they learned from participation as it relates to tools, skills and resources utilized and knowledge gained.

Locations

Library branches in three Chicago neighborhoods, each with a separate tween advisory group. Branches were chosen that serve populations reflective of the diversity that exists across the library system's service population.

Timeline

90-minute program sessions, held weekly.

Partners

- Museum of Science and Industry
- Institute of Electrical and Electronics Engineers

INSTITUTE of Museum and Library SERVICES

The program outlined above was piloted as part of ULC's Partners for Middle School STEM initiative. This project was made possible in part by the Institute of Museum and Library Services grant LG-95-18-0025-18.

Click here to learn more.

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HOW IT WORKED

Engaging Tween Advisors

- Youth librarians recruited tweens who were frequent library visitors to participate in advisory groups for the program.
- Each of the three branches hosting pilot programs had an associated advisory group at another location in a similar neighborhood.
- The advisory groups consisted of four to five tweens who met to discuss the difficulty of the initial activities staff created.
- Advisory group tweens were asked questions such as:
  - Is this activity too hard or not hard enough?
  - Did you receive enough time for the activity?
  - What do you know about STEM?
  - What is your experience and comfort level with STEM?
- The initial activity designs were revised according to the advisory group responses.

Designing Challenges

- Newspaper Engineering: Participants used very basic and limited materials to build structures to meet specific criteria.
  - Materials used: Newspaper sheets, masking tape, chip board, scissors.
- Disaster Engineering: Participants designed a structure that could withstand wind and water using numerous supplies and implemented similar design concepts that engineers utilize when building homes in hurricane-prone regions.
  - Materials used: Index cards, paper straws, craft stick, string, masking tape, 1 tennis ball.
- Catapult: Participants designed a catapult that could launch a projectile at least 10 feet.
  - Materials used: Rubber bands, craft sticks, plastic spoons, tape and dowels.

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WHAT WE LEARNED

Lessons Learned

- Incentives must be scaled appropriately for challenges. If prizes are too significant, they draw focus away from the activities.
- It takes careful planning to ensure activities are challenging but still attainable for tweens.
- Tiered activities can increase engagement for small groups by allowing them to build on previous activities.
- Challenge design must include ample time for repeated attempts and reflection.
- Participants enjoy the competitive nature of the activities and working together in groups.
- Staff conducting these programs prefer to have the opportunity to design challenges rather than being given activities.
- Youth have many interests beyond STEM and look for opportunities to express themselves through art/writing and engaging with their peers.

Evaluation Methods

- Participants used large post-it notes to leave feedback at self-reporting stations.

Outcomes

The pilot program's results equipped the library to:

- Create new and more robust STEM programming.
- Improve current programming offerings for tweens.
- Gain staff confidence and build capacity to work more successfully with tweens.

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