The Mamie Doud Eisenhower Public Library has offered science programs to the Broomfield community since 2004. The primary focus has been to build foundations in STEM concepts for tweens and teens (ages 9-14). In 2014, the library launched the Discovery Lab—a STEM/Makerspace which both increased and challenged our abilities to present a wider variety of science programming through staff education, renovated space, and new community partnerships. In this session, library staff will share our experiences, successes, and challenges in developing new programming formats for STEM learning and provide an overview of the realities of current STEM programming and the future needs we hope to meet by creating new models and stronger collaborations with community members and organizations.

**Directed Learning**
- Activities designed by an expert
- Product driven by specific parameters
- Single topic with 1-4 activity centers
- Single topic with 1-4 activity centers
- Contacting & scheduling experts and staffing programs
- University Educators: CU Science Discovery
- Adult Volunteers: Science Task Force
- Local businesses: Sandoz Pharmaceuticals

**Outcomes:** Skill building & exposure to topic

**Challenges:** Finding experts who have knowledge and skills to educate and motivate youth attendees, incorporating hands-on learning, managing and making learning meaningful for large groups, staff time dedicated to STEAM learning

**Successes:** Staff/participants build a relationship with the expert & form continuing relationships with community partners, participants exposed to new learning styles and experts who work in the field, peer-to-peer sharing/learning

**Future Needs:** Unlimited pool of community experts, continued financial support for funding presenters, identifying materials and presenter needs

**Example Programs:** ST programming, Anatomy in Clay, Electronic Greeting Cards, Birdhouses

**Multi-Session Format**
- Activities designed by an expert
- Product driven by specific parameters
- Single topic
- Skills are built over multiple weeks/sessions
- Contacting & scheduling experts
- Collaborating with experts to create curriculum & outcomes
- Staffing programs
- Individual hobbies: library staff
- Amateur experts: members of the local community
- Professionals in the field

**Outcomes:** Skill building/learning, process rather than product

**Challenges:** Participants and presenters to commit to multiple sessions. Committing to one topic for an extended period, storing and tracking materials/projects over the duration of the course, limited number participants at a time

**Successes:** Staff/participants build a relationship with the experts & community partners, audience are self-selected participants who are interested in the topic, participants can go deeper into the topic & practice advanced skills, peer to peer sharing/learning

**Future Needs:** “Program in a Box” - curriculum and materials for staff to facilitate programs, ask ORGANIZATIONS if they can offer/design multi-session programs, continued financial support for funding presenters and materials.

**Passive Format**
- Activities designed by an artist/maker
- Learning through observation & practice
- Contribution to a community project

**Outcomes:** Exposure to an artist at work, contribution to a community project, family learning opportunities and engagement

**Challenges:** Finding, scheduling, booking artists/maker, unseen audience demographics, additional staffing

**Successes:** High attendance, return rate, exposure of artist/maker and other maker programs, enthusiasm for future programs

**Future Needs:** Unlimited pool of artists/makers, financial support for funding presenters/materials, innovative programming (outdoor, large scale)

**Example Programs:** Woodworking, Collage, Weaving

**Single Session Format**
- Activities designed by participant
- Product driven by invention & creativity
- Single topic with 1-4 activity centers
- Staff time spent researching, testing, and implementing activities
- Volunteers: City’s Health & Human Services, IT
- Volunteers: Teens to help staff programs: “Teens for Tweens”

**Outcomes:** Skill building & inventing

**Challenges:** Designing the activity to appeal to the designated audience, designing activities that allow for invention, offering enough variety for the participants to invent, hour time frame, planning ahead to identify and purchase materials, compliance with city safety standards

**Successes:** Peer to peer sharing/learning, empower participants to create rules and be the expert, encourages participants to explore non-traditional learning structures

**Future Needs:** Offer single sessions multiple times with different set of participants, staff time/training dedicated to STEM learning and program design, develop partnerships with experts who can offer invention as a learning outcome

**Example Programs:** Emulsions, Food renovation, Take it Apart (Electronics)

**Exploratory Learning**
- Activities designed by participant
- Product driven by invention & creativity
- Single topic
- Skills are built over multiple weeks/sessions
- Staff time spent researching, testing, and implementing activities
- Volunteers: Teens to help staff programs: “Teens for Tweens”

**Outcomes:** Skill building/learning, inventing, critical thinking

**Challenges:** Designing activities that allow for invention, offering enough variety for participants to invent, hour time frame, planning ahead to identify and purchase materials

**Successes:** Peer to peer sharing/learning, empower participants to create rules and be the expert, encourages participants to explore non-traditional learning structures

**Future Needs:** Staff time/training dedicated to STEM learning and program design, develop partnerships with experts who can offer INVENTION as a learning outcome

**Example Programs:** Land, Sea, and Air, Rube Goldberg, Green Screen

**Maker-In-Residence Format**
- Activities designed by an artist/maker
- Learning through observation & practice
- Contribution to a community project

**Outcomes:** Self-guided activities

**Challenges:** No staff presence - library receives minimal feedback or evaluation of activities, accurate attendance numbers, unseen audience demographics

**Successes:** Extends participation to a wider audience beyond ages 9-14yrs, offers curiosity driven and independent learning, draws attention to Discovery Lab programming

**Future Needs:** Prepared modules from outside organizations with simple learning models or activities that staff could choose and order on-line.

**Example Programs:** Take it Apart and Put it Back Together (Bicycle), Pocket Solar System, Snap Circuits, Musical Instruments

**Key**
- Directed Learning (Activities designed by an expert):
- Exploratory Learning (Activities designed by participant):
- Audience (Age and Group size):
- Number of Participants Per Day (1-100):
- Level of Staff Involvement (Low to High):

**Community Partnerships:**
- Local artists & makers
- Volunteers as greeters
- ALL AGES
- Individual & large group work

**Outcomes:** Self-directed learning, reinforces Discovery Lab as a place for exploration outside of structured workshops, creates family and intergenerational learning opportunities

**Challenges:** No staff presence - library receives minimal feedback or evaluation of activities, accurate attendance numbers, unseen audience demographics

**Successes:** Extends participation to a wider audience beyond ages 9-14yrs, offers curiosity driven and independent learning, draws attention to Discovery Lab programming

**Future Needs:** Prepared modules from outside organizations with simple learning models or activities that staff could choose and order on-line.

**Example Programs:** Take it Apart and Put it Back Together (Bicycle), Pocket Solar System, Snap Circuits, Musical Instruments