# Creating & Using Logic Models: Examples from the Field

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### **Program Evaluation**

The application of systematic analytical (social science research) methods to address questions about program operations & results.

How was it implemented?

What was the effect?



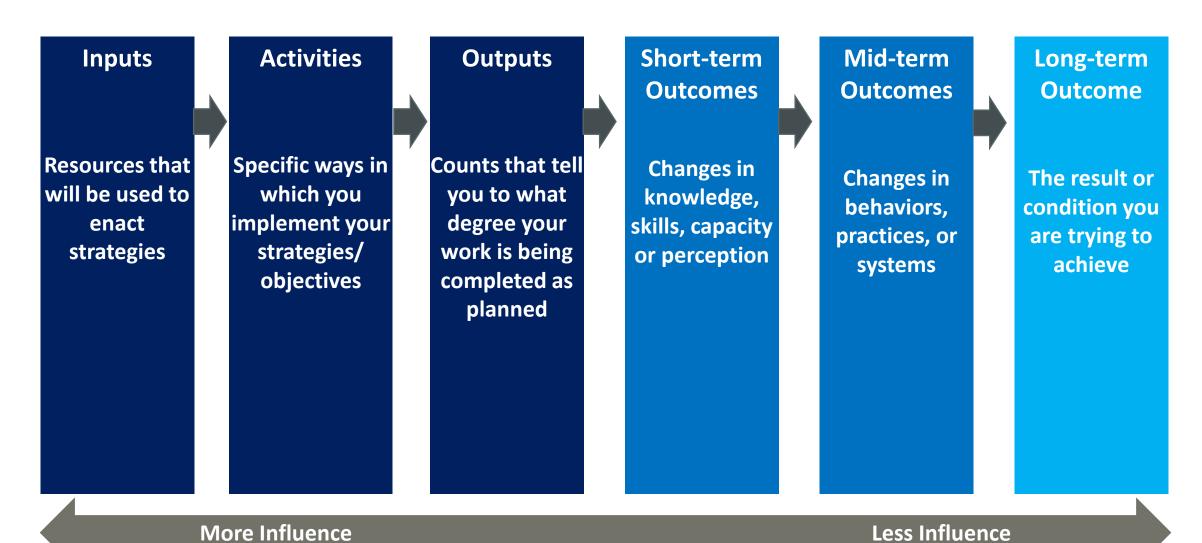
### Why Evaluate?

Accountability to funders/sponsors

Demonstrate & celebrate success

Program improvement/development

### Logic Model





- Inputs
- Activities
- Outputs

- Outcomes
  - Short-term
  - Mid-term
  - Long-term
  - Population

What resources will we use to enact our strategies?



- Inputs
- Activities
- Outputs

- Outcomes
  - Short-term
  - Mid-term
  - Long-term
  - Population

What are we doing to implement our strategies?



- Inputs
- Activities
- Outputs

- Outcomes
  - Short-term
  - Mid-term
  - Long-term
  - Population

How do we know we are doing the work (how many, how much)?



- Inputs
- Activities
- Outputs

- Outcomes
  - Short-term
  - Mid-term
  - Long-term
  - Population

What knowledge, skills, capacity or perceptions will change?



- Inputs
- Activities
- Outputs

- Outcomes
  - Short-term
  - Mid-term
  - Long-term
  - Population

What behaviors, practices or systems will change?



- Inputs
- Activities
- Outputs

- Outcomes
  - Short-term
  - Mid-term
  - Long-term
  - Population

What long-term conditions will change for program participants?



- Inputs
- Activities
- Outputs

- Outcomes
  - Short-term
  - Mid-term
  - Long-term
  - Population

# What/who is impacted by our work (to what do we contribute)?

#### **Program**

 Percent of participants graduating from high school.



#### **Population**

• Percent of Mainers graduating from High School.



# **Examples from the Field**

**Montana & South Dakota** 



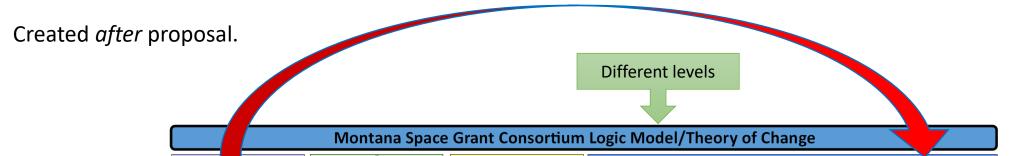
Midcourse improvements

#### Montana Space Grant Consortium Logic Model/Theory of Change

#### Goals **Outputs/Measures Outcomes and Impacts Inputs Develop and connect** Post activity surveys Participants: **Short Term** Mid Term **Long Term** programs Participant presenta-For student participants: For student participants: Student participants Student participants continue on to graduate tions, reports, and publi-Build a Montana aero-Affiliate Representatives Improved knowledge of Improved career skills cations school or STEM careers space workforce related STEM topics MSGC leadership Improved development Documentation of mile-Student participants Network institutions, Improved attitudes toof STEM identities Faculty members feel prepared to lead stones and tasks, e.g. industry, government ward STEM 12% of student partici-Increased understandfuture STEM research Evaluation team **Expand NASA-related** For all participants: pants are underrepreing STEM careers and Increased number of MSGC Advisory Board research sented, 50% are womaccess to SMEs Montana professionals Increased engagement Research mentors en, 90% indicate posithat engage learners in with peers For all participants: tive impact, 90% contin-**Assumptions** Organizations: NASA-related research Increased engagement Increased understandue to STEM employ-Students want to partic-All MT institutions of Increased collaborawith diverse role moding of the importance of ment or an advance ipate higher education tions amongst MT NASA els diversity in education STEM degree. Communication struc--related researchers and the workplace Museum and industry Increased participation Communications and ture sufficient in equitable, accessible Increased capacities partners Improved understandinterviews with leaders. Colleges and universilearner-centered expeamong participants, ing of diverse cultural NASA OSTEM participants, and partties are supportive leaders, and SMEs to riences perspectives of science ners US Hill leaders offer inclusive, equita-Increased understand-Increased ability to con Advisory Board feedback Risks ble STEM education MT Legislature ing of the research product research Recruiting, selecting, Lead institution: Mon-Increased connections cess Increased participation and supporting students tana State University with other STEM net-For Montana HE faculty: in community of STEM works Montana pay and housactivities Increased number of ing challenges proposals submitted to NASA **Major Activities** See SMART Objectives Document

**Evaluation** 

**Evidence of Outputs and Outcomes** 





Space Act Goals – Never changing, literally an act of congress! Develop and connect programs

Goals

Build a Montana aerospace workforce

Network institutions, industry, government

Expand NASA-related research

#### Assumptions

Students want to participate

Communication structure sufficient

Colleges and universities are supportive

#### **Risks**

Recruiting, selecting, and supporting students

Montana pay and housing challenges

#### Inputs

Participants:

Affiliate Representatives

MSGC leadership

Faculty members
Evaluation team 

MSGC Advisory Board

Research mentors

Organizations:

All MT institutions of higher education

Museum and industry partners

NASA OSTEM US Hill leaders

MT Legislature
Lead institution: Mon-

tana State University

#### Outputs/Measures

Post activity surveys

Participant presentations, reports, and publications

Documentation of milestones and tasks, e.g. 12% of student participants are underrepresented, 50% are women, 90% indicate positive impact, 90% contin ue to STEM employment or an advance STEM degree.

Communications and interviews with leaders, participants, and partners

Advisory Board feedback

### Outcomes and Impacts Short Term Mid Term

#### For student participants: For student participants:

Improved knowledge of related STEM topics Improved attitudes to-

#### For all participants:

ward STEM

Increased engagement with peers

Increased engagement with diverse role models

Increased participation in equitable, accessible learner-centered experiences

Increased understanding of the research pro-

#### For Montana HE faculty:

Increased number of proposals submitted to NASA

#### Mid Term

Improved career skills

Improved development of STEM identities

Increased understanding STEM careers and access to SMEs

#### For all participants:

Increased understanding of the importance of diversity in education and the workplace

Improved understanding of diverse cultural perspectives of science

Increased ability to conduct research

Increased participation in community of STEM activities

#### Long Term

continue on to graduate

school or STEM careers Student participants feel prepared to lead future STEM research Increased number of

Student participants

Montana professionals that engage learners in NASA-related research

Increased collaborations amongst MT NASA -related researchers

Increased capacities among participants, leaders, and SMEs to offer inclusive, equitable STEM education

Increased connections with other STEM networks

What is you SG want to see from the goals in your state?

All SG (should) have SMART Objectives with metrics.

**Major Activities** 

See SMART Objectives Document

Midcourse improvements

Evaluation

**Evidence of Outputs and Outcomes** 

Living document:
Look at what is the ROI.
(Through evaluation)

What areas need work (midcourse improvements).

Midcourse improvements

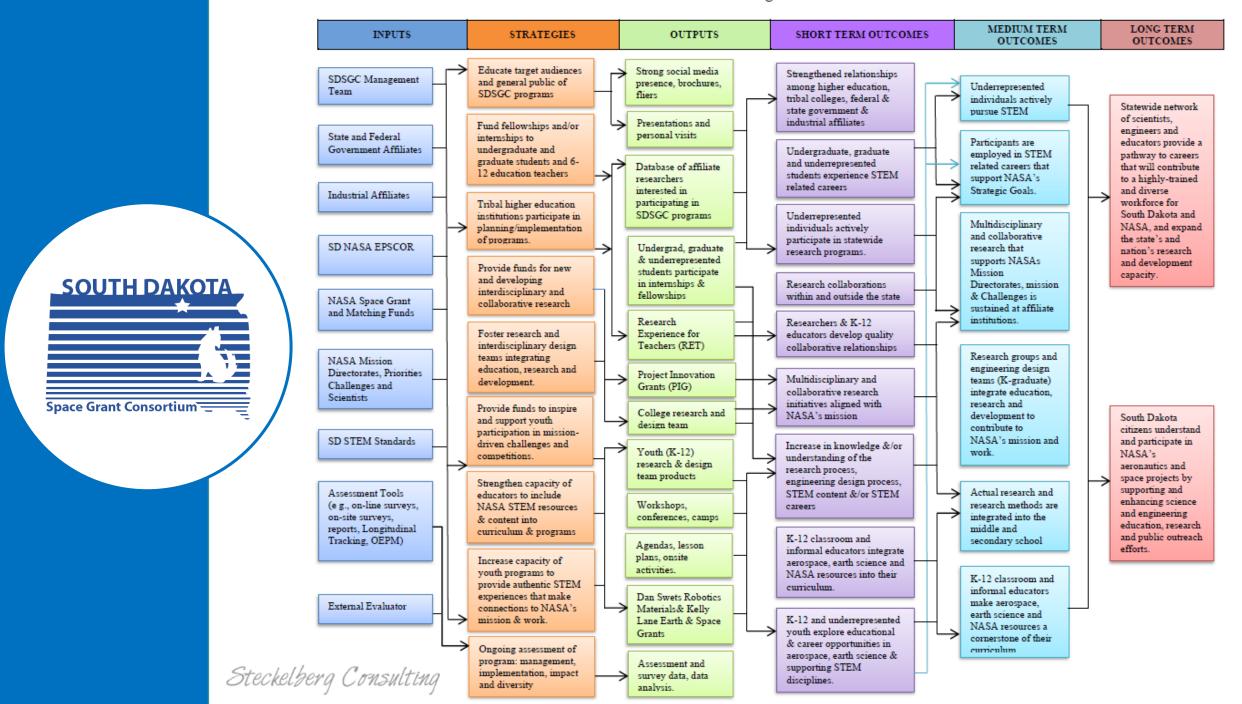
#### **NEBP Logic Model/Theory of Change** Goals **Outputs/Measures Outcomes and Impacts** Inputs Participants: **Enable inclusive STEM** Annual surveys of (1) **Short Term** Mid Term Long Term student participants, (2) education For student participants: Student participants For student participants: Student participants leaders. (3) other particcontinue on to graduate Advance understand-Team leads Improved career skills Improved knowledge of ipants, and (4) signifischool or STEM careers ing of the process of related STEM topics cant partners (see de-NEBP leadership Improved development science Student participants tails in evaluation plan) Improved attitudes toof STEM identities Subject Matter Experts feel prepared to lead ward STEM Create and enhance Post activity surveys Increased understandfuture STEM research Evaluation team networks and part-Student portfolios For all participants: ing STEM careers and Increased number of **Education Advisory** nerships access to SMEs Team reports, media, institutions that engage Increased engagement Board and publications learners in research with peers For all participants: Guest educators **Assumptions** involving remote sens-Documentation of mile-Increased engagement Increased understand-Organizations: Teams want to particiing platforms stones and tasks (e.g. with diverse role moding of the importance of pate Increased collabora-Space Grant Consortia 50% of student particiels diversity in education Pod communication pants are underrepretions amongst academic and the workplace Home institutions Increased participation structure sufficient sented or underserved, ballooning programs in equitable, accessible Improved understand-**NASA OSTEM** team preliminary and Local Space Grant Con-Increased capacities learner-centered expeing of diverse cultural NASA Balloon Program critical design reviews among participants, sortia are supportive riences perspectives of science and tasks completions, Office leaders, and SMEs to Increased understand-Increased ability to con utilization of external Risks Eclipse Soundscapes offer inclusive, equitaing of the design, build, duct research partners, etc.) ble STEM education Recruiting, selecting, Heliophysics Education test, fly, analyze, and Increased participation Communications and and supporting teams Activation Team report process Increased national in community of STEM interviews with leaders, eclipse education capa-Logistical constraints Science Activation activities participants, and partbilities Event weather Industry partners ners For project: Increased connections with other STEM net-Increased NASA solar **Major Activities** eclipse efforts works See project tasks in Section 2.5 and learner experiences in Figure 3.

Evaluation

**Evidence of Outputs and Outcomes** 



A lot of overlap from MSGC's Logic Model.



### Skill Builder Exercise

### For each item listed, decide if it is a:

- 1) resource/input
- 2) activity/strategy
- 3) output
- 4) goal

### **Logic Model Game**

**Educational Affiliates** 

Strengthen the capacity of educators to use NASA resources & content into their classroom & programs.

Workshops, conferences, camps

Educators integrate aerospace, earth science & NASA resources into their curriculum.

**Academic Affiliates** 

Provide travel funds for student & faculty researchers

Faculty researchers visit
NASA centers

Direct research collaborations with NASA centers/personnel

### **Logic Model Game**



NASA Space Grant & matching funds



Fund
fellowships &
internships to
undergraduate
& graduate
students



Undergrad, graduate, & underrepresented participate in internships & fellowships



Alumni are employed in STEM related careers that support NASA's Strategic Goals



Increase in knowledge &/or understanding of the research process



State Space Grant Consortium



Pilot/smallscale research projects



Students attend graduate school

Provide funds to inspire & support youth participation in mission-driven challenges & competitions.

NASA Mission
Directorates, Priorities,
Challenges, & Scientists

Underrepresented individuals pursue STEM careers creating a more diverse workforce

**Evaluator** 

Provide funds for new & developing interdisciplinary & collaborative research

Research capacity & graduate programs are enhanced, enabling more competitive & diverse STEM research & education

Statewide network of scientists, engineers, & educators

Youth research & design teams

## Logic Model Game

### **Logic Model Game**



Tribal higher education institutions participate in planning & implementation of programs.



Researchers & K-12 educators develop quality collaborative relationships



Assessment & survey data, data analysis



Provide funds to inspire & support youth participation in mission-driven challenges & competitions.



**Career fairs** 



**STEM Standards**