# The Do-It-Yourself Guide to STEM Community Engagement

## How to Build Sustainable Education Innovation in Your Community

### First Edition 2012

NC STEM

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# INTRODUCTION

## What to Expect?

This *Do-It-Yourself Guide to STEM Community Engagement* will provide schools, districts, and local community organizations with self-guided tools to engage a broad community of stakeholders in sustainable education innovation. This guide and related tools are informed by numerous researched sources and successful implementations in North Carolina communities - some of which are highlighted in this resource. These communities successfully implemented and improved upon NC STEM Community Collaborative's Community Visioning & Design Process since 2008 to the evolution of the STEM Community Engagement Process provided for you today.

## Why STEM Education?

STEM is the foundation for:

- Producing critical thinkers, innovators, and problem-solvers
- Connecting classroom lessons to real-world problems
- Encouraging inquiry and collaborative learning
- College and career readiness
- Fostering cross-sector partnerships that provide informal learning opportunities

## Why STEM Community Engagement?

Science, Technology, Engineering, and Mathematics (STEM) skills are critical to North Carolina's present and future prosperity. Across the United States, growth in traditional STEM fields are expected to be the fastest-growing employment sectors.  Georgetown University's Center for Workforce and Education notes that U.S. education systems are not producing enough STEM-capable students to keep up with traditional STEM-capable sectors or other sectors across the economy that demand similar skills. North Carolina reflects these broader U.S. trends. Even for students not pursuing STEM-related careers, responsible citizenship today requires a foundation of solid STEM education; be it engaging in health care, understanding environmental stewardship, understanding current geopolitics, or explaining global opportunities and crises. Unfortunately, our communities are unable to meet the needs of such high-tech jobs due to our students lacking these skills. Maintaining our scientific and technological leadership is essential to our economy, our national security, and our future.

Change begins in our communities. STEM Community Engagement is based on the Community Visioning and Design Process (CVP) developed by NC STEM and is a viable solution to bridging the gap between our education pipeline and the needs of today's workforce.

## Community Visioning and Design Process

**COMMUNITY ENGAGEMENT**

**Community Engagement**
**6 months**
• Letter of Agreement
• Letters of Support

**Visioning**
**2 months**
• Asset Map/SWOT Analysis
• Vision Statement

**Design**
**4 months**
• Design Statement
• Theory of Change
• Education Innovation Design Plan (ENDP)

**Review/Feedback Redesign**
**3 months**
• Redesigned ENDP
• Memorandum of Understanding

**Business Planning**
**6 months**
• Business Plan Development

**Innovation Implementation**
**Ongoing**
• Project Accountability

**STEM Communities**

Through this engagement process, a STEM Community brings together local community leaders to develop a long-range plan to improve STEM education in their local schools. This step-by-step guide is a proven method for engaging all sectors of the community in visualizing, planning, and building groundbreaking education efforts that mirror the area's economic needs. This process will help push innovation further faster by investing in local communities and linking them with the best resources in North Carolina and beyond.

The STEM Community Engagement process develops a long-range plan to improve STEM education by bringing together a diverse group of community members to plan, design, and create innovative changes in how we teach and learn. National research, education best practices, engineering design processes, and other community engagement protocols have informed the development of the phases, activities, and milestones of the process. All stakeholders in these efforts are unified by 5 Design Principles to drive the work:

- **Equitable:** Make STEM literacy and economic opportunity attainable for ALL students.
- **Scalable & Sustainable:** Drive educational innovation and economic alignment in a coordinated and methodical way.
- **Innovative:** Give communities the tools needed for transformative changes to STEM education.
- **STEM-Focused:** Empower and support a culture that nurtures and supports innovative STEM professionals, and brings businesses, schools, nonprofits, and other community institutions together to prepare students and communities for 21st century jobs.
- **Collaborative:** Develop a statewide network for STEM excellence through local, state, and national networks and evidence-based research.

Over the past three years, the STEM Community Engagement process has helped five communities throughout the state with positive outcomes including sustained local engagement, multiple small and large education innovations, increase network behavior, policy change, and cross-sector investments.

## Who Should Use This Guide?

Simply put, YOU – anyone with a desire to impact their local community and economy through education innovation. This guide is intended to unite schools, districts, communities, and others focusing on community engagement for creating 21st century education for all kids.  This guide was designed for teams to implement. However, whether you are a individual or a group, you'll find the tools, process, and support to create STEM innovation in your community.

## How to Use This Guide?

There are two ways to use this guide: 1. Self-Directed - the guide gives you everything you need to "do-it-yourself" or 2. Facilitated - working with an engaged, but impartial facilitator. Based on prior work in North Carolina communities, we recommend a facilitated process for deep engagement, which includes "on-the-ground" delivery of targeted area expertise and/or STEM content. This guide is made up of four modules: **Community Engagement**, **Community Visioning**, **Innovation Design and Business Planning**, and **Implementation**. Each module includes detailed documentation of the phases and milestones and is cross-referenced with sample presentations, worksheets and other useful materials. Despite sequential format of this guide, each module has the potential to serve as an independent resource as the needs and objective(s) for each community likely will be different.

The following icons will be useful as you use this tool – highlighting valuable definitions, tips, and links to materials:
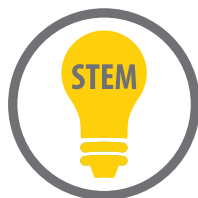
**STEM**

**Highlights vital STEM attributes in the text**

**QUICK TIP**
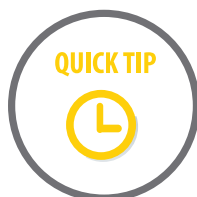
**Provides supplemental tips and information**

**Progress Indicators to gauge growth during the process**

## What is the Engineering Design Process & how does it inform this work?

The Engineering Design Process is a cyclical method by which new solution-oriented developments are created. Some version of the process is used by companies like Apple and IDEO to create new technology, or engineering firms to design bridges or computer chips, or even students competing in robotics competitions. For the purposes of this guide, we will utilize the process provided by N.C. State University College of Engineering. This five-step process consistently helps us to ask questions, plan, do, refine, and ask again. Take note, this is something you will do in every module.

**STEM**

*The Engineering Design Process builds critical-thinking skills to form new ideas to create innovative solutions - ask questions, plan, do, refine, and ask again.*

This guide reflects the Engineering Design Process. Each module moves your community through the process.

**ASK**

**Module 1: Community Engagement**

Ask what is the Problem?

What are the constraints?

**IMAGINE**

**Module 2: Visioning**

Brainstorm ideas
Choose the best one

**IMPROVE**

**Improve**

What can make it better?

**PLAN**

**Module 3: EIDP**

Draw a diagram
Consider materials

**CREATE**

**Module 4: Implementation**

Follow the plan
Test it out!
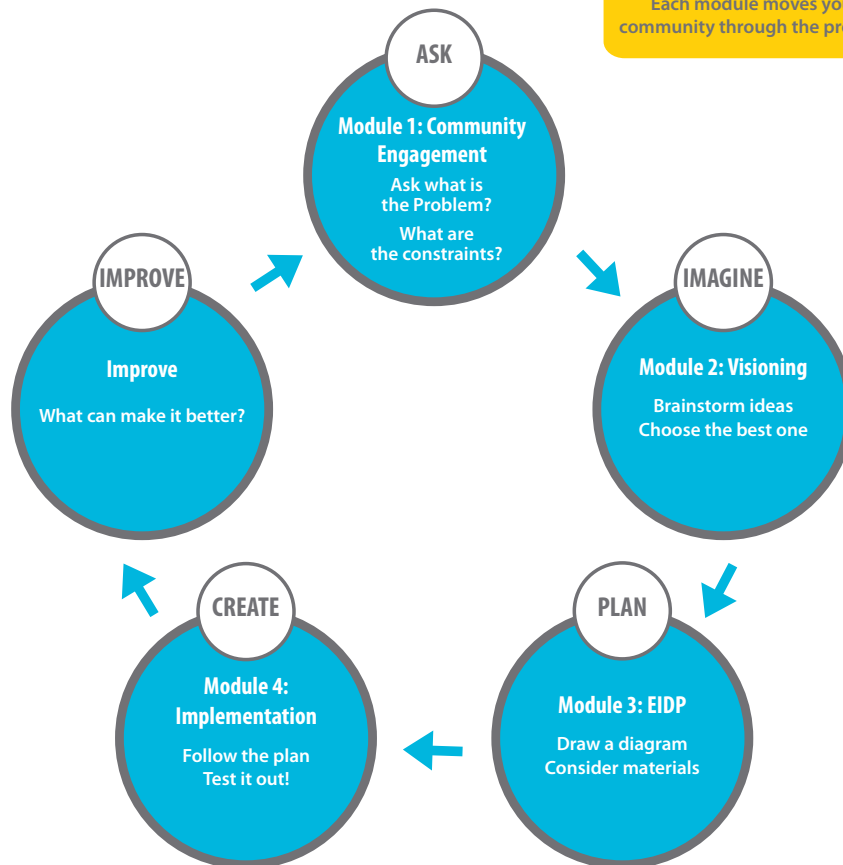
**Engineering Design Process**
*A Series of Steps that Leads to the Development of a New Product or System*

You can start at any step in the process but skipping the first question may impact the sustainability of your community innovation. After you improve your design once, you might want to begin it all over again to refine your solution, or focus on one particular area.

## Community Engagement Never Stops

Each module will have a section dedicated to further engage your community in the process; because their ownership breeds your innovation's sustainability.

**It's critical** to build a "buzz" in your community about your exciting work.

**It's critical** to identify the core message(s) that will open your community's hearts and minds.

**It's not critical** to tell people everything because you don't know everything.

**It's not critical** to tell them where you're going because you don't know yet.

**It's critical** to let them know they have a say in where your community is going.
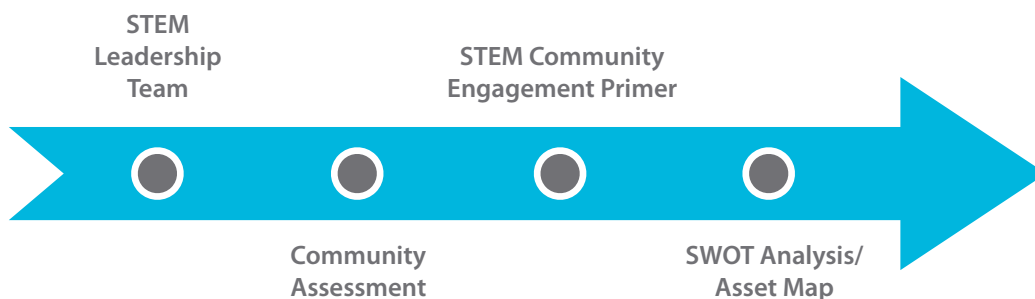
# MODULE 1: COMMUNITY ENGAGEMENT

## What to expect in this module?

In this module your community will:

- Determine readiness to engage in the STEM Community Engagement Process
- Understand the function and composition of a STEM Collaborative Team
- Recognize the immediate and long-term benefits of developing cross-sector community engagement
- Acquire knowledge of the resources available to engage your community to impact STEM and economics

## Timeline

STEM
Leadership
Team

STEM Community
Engagement Primer

Community
Assessment

SWOT Analysis/
Asset Map

## Introduction to Community Engagement

Communities play a unique and vital role in the development of equitable and sustainable innovations. Engaging a community and its members in its own future provides fertile ground for new ideas, and the opportunity for broad ownership of the ideas and plans that are adopted. Key community stakeholders do not always serve as public officials, business titans, or even community leaders. By identifying a diverse sampling to support and engage in the design process, a community is more likely to have a path of more impactful and sustainable innovations.

While this guide is self-paced, remember that you are building a broad coalition of support to sustain your ongoing efforts. Community Engagement, the first phase of the STEM Community Engagement Process, can be completed over a six-month period with positive results. The five stages of Community Engagement include: Community Research, Letters of Support, STEM Leadership Team Development, Community Orientation, and SWOT Analysis. This prescriptive series of activities and tasks are intended to assess the readiness of the community, establish the STEM leadership team for the initiative, and engage community leaders and members in the process.

**STEM**

*Broad, diverse community engagement increases your ability to influence state policy, connect with valuable expertise, and access resources and assets to move STEM education and economic development further, faster.*

Prior to the onset of this process it is vital that you identify a facilitator, whether it is a leader within the community or an independent third party. This leader or organization will guide the engagement, design, and implementation of your innovation. In this module you will find the community engagement phase in an outline format including the purpose, tools, materials, and action items.

**NC STEM**

Use this module to guide your community engagement activities. Each phase of community engagement (STEM Leadership Team, Community Assessment, STEM Community Engagement Primer, and SWOT Analysis/Asset Map) includes goals, objectives, materials, and the action items you will need.  Remember engaging your community in the decisions for the future is vital to sustainable change and success. You will continue to do this through all modules.

## ✓ Progress Indicators

| Module | Phase | Progress Indicators | |
|---|---|---|---|
| | | "Soft": Qualitative | "Hard": Quantitative |
| **Community Engagement** | **Building a STEM Leadership Team**<br><br>*Core Outcome*<br><br>*Build a STEM Leadership Team of cross-sector leaders that will guide the community through the vision, design and implementation of an education innovation.* | ° Facilitators of the STEM Leadership Team have been identified and have the ability to lead a cross-sector group through the engagement process<br>° Community leaders identified to serve on the STEM Leadership Team have the capacity to fulfill all outlined roles/responsibilities<br>° Concrete communications plan is established to manage internal and external communication pathways | ° At least 15 design team members with representatives from all appropriate sectors<br>° At minimum, a quorum present at all meetings and events<br>° At minimum, bi-weekly communication to send updates, follow-up on action items, or setup future meetings/events |
| | **Assessing Community Readiness**<br><br>*Core Outcome*<br><br>*Assess the readiness of a community – snapshot of attributes and resources that potentially add value or present a challenge during engagement.* | ° Clear evidence of an economic imperative and/or cluster of innovation that highlights instances the community has mapped its needs to innovative solutions<br>° Data points generated from interview responses establish a baseline for a community's capacity to engage in this process | ° Evidence of at least one economic imperative in community/region<br>° Evidence of at least one innovation cluster with in community/region<br>° Interview one representative from each sector to gauge readiness of community from a varied number of perspectives |
| | **STEM Community Engagement Primer**<br><br>*Core Outcome*<br><br>*Inform community leaders selected to serve on the STEM Leadership Team of the purpose and function of the engagement process.* | ° Leadership Team is knowledgeable about STEM Engagement process and tools<br>° Establish Leadership Team norms; standards by which team members agree to operate - meeting schedules, rules of engagement, etc. | ° At minimum, a quorum of the STEM Leadership Team present at STEM Community Engagement Primer<br>° At minimum, one representative from each sector present at STEM Community Engagement Primer – responsible for communicating with general community population |
| | **SWOT Analysis/ Asset Mapping**<br><br>*Core Outcome*<br><br>*Identify community assets and determine potential barriers to success.* | ° Asset map that outlines local resources – highlighting assets from all sectors within the community<br>° Targeted strategies to pursue opportunities aligned with strengths of community<br>° Strategic plan to overcome weaknesses to pursue opportunities<br>° Targeted strategies to build on strengths that reduce potential roadblocks<br>° Strategic plan to prevent weaknesses from hindering progress | ° Inventory of at least 10 existing assets and potential opportunities from the perspective of each sector<br>° Inventory of at least five existing weaknesses and potential threats from the perspective of each sector |

## Phases of Community Engagement

### Building a STEM Leadership Team

**Where Are You Now?**
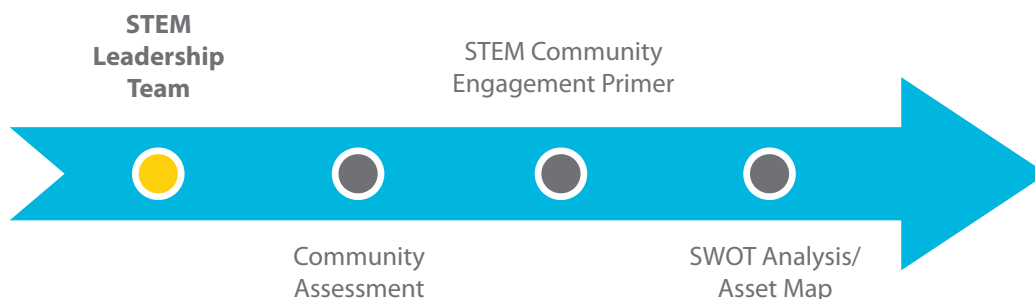


**Goal:** To build a STEM Leadership Team of cross-sector leaders that will guide the community through the phases of the STEM Community Engagement Process.

**Overview:** Your community's STEM Leadership Team is responsible for guiding the community through the STEM Community Engagement Process. To ensure widespread representation of community needs, it is imperative the leadership team be a diverse representation from the following sectors: *Direct Business, Economic Development Business, Community College, K-12 public school system or local education agency, Institution(s) of Higher Education, Community Organization(s), Government/Policy, and other entities identified as critical community partners ( health care, corporate, chamber, media, etc.).*

**QUICK TIP**

*To ensure breadth and reach of your efforts in the community, identify leading decision makers in education, policy, and business to serve on STEM Leadership Team.*

Ideally, the STEM Leadership Team will have a collective ability to:

- Communicate the interests of the community they represent
- Influence the opinion of the community at-large
- Maintain steady and prominent leadership throughout the entire process
- Envision community growth through innovation
- Bring staffing to the endeavor (ability to staff effectively)
- Actively participate in identifying technical approaches and problem solutions
- Identify technical assistance needs and communicate those needs for support alignment
- Design and coordinate all meetings, determine objectives, prepare agendas, and confirm attendees

**NC STEM**

**STEM LEADERSHIP TEAM**
12-15 MEMBERS

**EMBEDDED'STAFF**
2-3 MEMBERS

**COMMUNITIES AT LARGE**

**STEM LEADERSHIP TEAM:**
Will include members from the following sectors, at minimum:
- 1 Direct Business
- 1 Economic Development Business
- 1 Institute of Higher Education
- 1 Community College
- 1 k-12
- 1 Government/Policy
- 1 Community
- Team Leads who will sign Letter of Agreement: 1 direct business and 1 education
- Meet 2 times per month
- 12-5 members

**Materials/Tools:**

- STEM Leadership Team Composition graphic (see page XX in STEM Materials and Toolkit)

- STEM Leadership Team Information Worksheet (see page XX in STEM Materials and Toolkit)

- Roles & Responsibilities of Leadership Team (see page XX in STEM Materials and Toolkit)

**QUICK TIP**

*When developing STEM Leadership Team for multi-community engagement, identify leaders from each community in K-12, government/policy, direct business, and regional leaders in other sectors. This will result in a larger leadership team than displayed in this graphic.*

## Action Items

| Facilitator | Leadership Team | Community at-large | Action Item |
|:---:|:---:|:---:|---|
| ✓ | | | Identify individuals/cross-sector groups in the community to serve as a steering committee for STEM Community Engagement |
| ✓ | | | Put together a cross-sector STEM Leadership Team that aligns with Leadership Team composition recommendations |
| ✓ | | | Contact Leadership Team members, provide them with reference materials and invite them to participate in an information session |
| ✓ | | | Lead information session(s) with community leaders to communicate function and composition of a STEM Leadership Team |
| ✓ | ✓ | | Discuss and assign assumed roles and responsibilities of those on STEM Leadership Team |
| ✓ | ✓ | | Record details (contact information, sector details and assumed role) of leadership and distribute within team |
| ✓ | ✓ | | Assess gaps in expertise and continue to identify, engage, and secure other leaders in the community for STEM Leadership Team (may be necessary throughout engagement as a variety of needs arise) |

## Assessing Community Readiness

**Where Are You Now?**



STEM Leadership Team

STEM Community Engagement Primer

**Community Assessment**

SWOT Analysis/ Asset Map
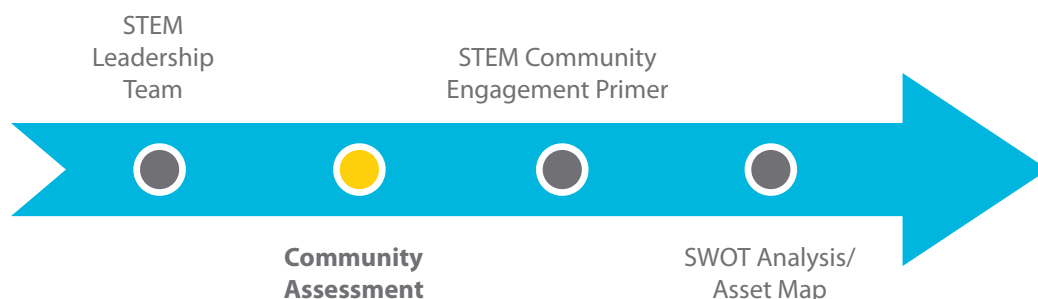
**Goal**: To determine readiness of a community to engage in the STEM Community Engagement Process.

**Overview:** Ensuring that the substantial changes to your community are sustainable, there has to be a level of readiness. The tools provided herein will guide you in the process of assessing your community's readiness and identifying gaps in preparation. Characteristics of a community ready to engage in this process include an existing or emerging economic imperative, diverse populations, leadership engaged in bridging education to the economy, and some history of institutional innovation and geographic diversity.

**QUICK TIP**

*Community assessment is vital when engaging multiple communities in this process. Identifying key characteristics is critical to impacting institutional change and development.*

**Materials/Tools:**

- NC STEM Readiness Assessment Tool (see page XX in STEM Materials and Toolkit)

**Action Items**

| Facilitator | Leadership Team | Community at-large | Action Item |
|:---:|:---:|:---:|---|
| ✓ | | | Identify individuals/cross-sector groups in the community to participate in Community Assessment activities |
| ✓ | | | Survey/interview community stakeholders using the Readiness Assessment Tool |
| ✓ | ✓ | ✓ | Collect and analyze community data; providing insight into the trusted communicators, gatekeepers, and others who might be considered for deeper involvement |
| ✓ | ✓ | ✓ | Collect and submit letters of cross-sector support for the STEM collaborative from leadership, organizations, and citizens |
| ✓ | ✓ | | Receive and record letters of support as submitted by community |

## STEM Community Engagement Primer

**Where Are You Now?**



STEM Leadership Team → Community Assessment → **STEM Community Engagement Primer** → SWOT Analysis/Asset Map
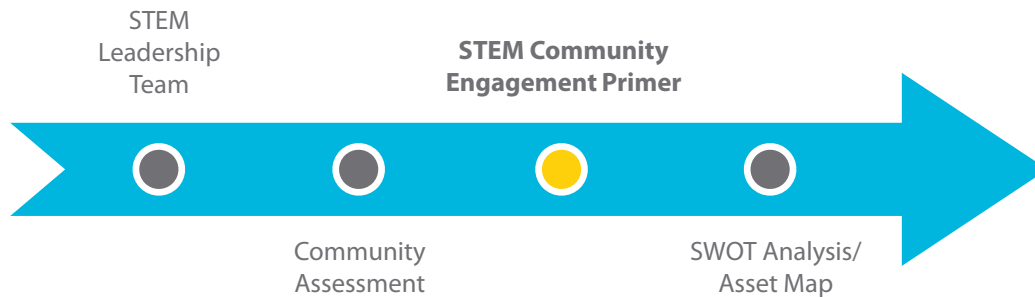
**Goal**: To share the purpose of the STEM Community Engagement process with the community leaders selected to serve on the STEM Leadership Team.

**Overview**: At the conclusion, session participants will:

- Understand the STEM Community Engagement Process and its capacity to activate innovation within a STEM Community
- Understand the function/composition of a STEM Leadership Team
- Recognize the immediate and long-term benefits of developing deep and diverse cross-sector community engagement
- Prepare to participate in STEM Community Engagement Process

**Materials/Tools**

- STEM Community Engagement Arrow (see page XX in STEM Materials and Toolkit)
- Timeline of Events (see page XX in STEM Materials and Toolkit)
- Agenda and Objectives (see page XX in STEM Materials and Toolkit)
- Primer Slide Deck (see page XX in STEM Materials and Toolkit)

**Action Items**

| Facilitator | Leadership Team | Community at-large | Action Item |
|:---:|:---:|:---:|---|
| ✓ | ✓ | | Receive and record letters of support as submitted by community |
| ✓ | ✓ | | Conference call with community leaders to convey purpose of event and recommendations of invitees |
| | ✓ | | Select and confirm location of Primer |
| ✓ | ✓ | | Develop invitation list |
| | ✓ | | Send invitations to invitees |
| ✓ | | | Prepare content to be delivered; slide deck with notes and narrative |
| ✓ | | | Prepare agenda and objectives |
| | ✓ | | Send invitations to invitees |
| ✓ | ✓ | | Record RSVPs and develop a list of confirmed attendees |
| ✓ | | | Confirm logistics |
| | ✓ | | Send reminder email to attendees to confirm location, attach agenda, objectives and materials |
| ✓ | | | Facilitate STEM Community Engagement Primer |
| ✓ | ✓ | ✓ | Hold a Primer Event |
| | ✓ | | Record meeting minutes and archive for later reference |
| | ✓ | | Distribute all notes and highlights of key decisions to all participants |
| ✓ | ✓ | | Establish next meeting date and location |

## SWOT Analysis/Asset Mapping

**Where Are You Now?**

STEM Leadership Team

STEM Community Engagement Primer

Community Assessment

**SWOT Analysis/ Asset Map**
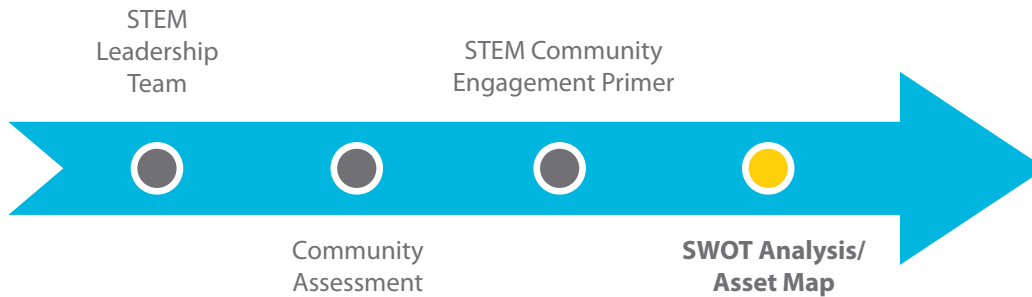
**Goal**: To determine community assets and identify potential barriers to success.

**Overview:** Innovation and competitive strategy begin with the assessment of the community's internal capabilities and external environment. This process is known as SWOT (*Strengths, Weaknesses, Opportunities, and Threats)*.

A SWOT analysis can offer helpful perspectives at any stage of the STEM effort. The goal is to produce an action plan to support what works, change what doesn't, seize opportunities, and minimize the threats your STEM effort.

You might use SWOT to:

- Identify community assets and challenges regarding the STEM effort

- Help a new group (such as the STEM Leadership Team) to focus on developing their mission and strategies

- Explore possibilities for new STEM efforts as solutions to existing problems

- Make decisions about the best path for your STEM initiative; identifying your opportunities for success in context of threats to success may help clarify directions and choices

- Determine where change is possible. SWOT may help take an inventory of your strengths and weaknesses and reveal priorities as well as possibilities for advancing STEM in your community

- Adjust and refine plans mid-course; a new opportunity for STEM innovation may open wider avenues, while a new threat may close a path that once existed

- Offer a simple way of communicating about your STEM initiative and an effective strategy for organizing information you've gathered from surveys or events, such as a STEM Community Kick-Off Event

**Materials/Tools**

- SWOT Analysis Template (see page XX in STEM Materials and Toolkit)

**Action Items**

| Facilitator | Leadership Team | Community at-large | Action Item |
|:---:|:---:|:---:|---|
| ✓ | | | Introduce SWOT Analysis template to collect data |
| ✓ | ✓ | | Schedule a leadership meeting to complete SWOT Analysis, secure logistics, agenda, and materials |
| ✓ | | | Provide technical assistance during data collection |
| ✓ | | | Facilitate SWOT Analysis Meeting |
| ✓ | ✓ | | Compile data into a comprehensive SWOT Analysis |
| ✓ | ✓ | | Analyze, record, and share outcomes of the SWOT Analysis; barriers to success and opportunities within the community |
| ✓ | ✓ | | Develop a strategic plan to remove barriers to success and use opportunities within the community |

## Community Engagement: Finding Hidden Assets - Positive Deviance

Community Engagement is vital to the discovery of the untapped talents, expertise, and resources that exist within your community. This process of revealing and optimizing existing solutions or strategies within your community and positively impacting behavior and social change is defined as *Positive Deviance*.  Researchers have observed this behavior in poverty stricken communities in Vietnam where a subgroup of the community was able to find a solution to childhood malnutrition despite facing similar challenges and lack of resources of their peers. It has been concluded from the application of Positive Deviant methodology that the "*focus on practice rather than knowledge has proven to be a key element in bringing about lasting behavioral change across the range of issues.*" The lesson to learn here is that positively deviant behavior in your community can be an invaluable resource while strategically designing solutions to impact education and the economy.  As you progress through this process, seek out instances of Positive Deviance and make efforts to replicate, duplicate, and scale them for broader community improvement.  For more information on positive deviance, read The Vietnam Story – Positive Deviance.

## In Practice: Community Engagement

The following highlights a successful engagement strategy in a North Carolina STEM Community



### CASE STUDY: *Got STEM?* campaign goes viral in Lenoir County, N.C.

STEM East in Lenoir County was developed by a group of citizens interested in developing STEM resources in Eastern North Carolina. Lenoir County is home to approximately 60,000 residents, and Lenoir County Public Schools serves approximately 10,000 students. The county demographics are similar to many Eastern North Carolina communities with significant poverty and educational and economic challenges.

STEM East worked with NC STEM on plans to leverage their existing local assets – especially those centered around Spirit Aerosystems and Global TransPark – to increase the real-world experience of teachers in several local school districts including Jones, Craven, Wayne, and Lenoir counties. They also continue to develop innovative learning tools, such as a regional STEM hub, that can serve Eastern North Carolina students and teachers.

The term "STEM" quickly became a household name in this community in a few short months. The success of this community engagement belongs to the "Got STEM?" campaign – a multi-platform marketing strategy that effectively engaged all community stakeholders in STEM efforts. The Leadership Team designed a logo to imprint on yard signs, bumper stickers, and pins. They took advantage of local media outlets such as newspapers, blogs and the school district website. The phrase "Got STEM?" made appearances at local fairs, meetings, and events – it essentially became a viral phenomenon throughout Lenoir County, eventually moving into other areas of the state.

As a result of these efforts, STEM East has involved more than 800 people and numerous national, state, and local organizations committed to making systematic changes in STEM education and fostering economic growth around STEM jobs. In addition, the group has received thousands of dollars from private funders including a $350,000 grant through Spirit Aerosystems and The Golden LEAF Foundation.

## CASE STUDY: STEM Video Challenge in Davie County N.C.
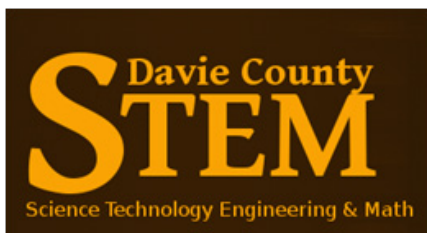


With approximately 40,000 residents, Davie County is located in the Piedmont Triad economic development region of North Carolina. The county takes pride in its scenic setting while still having access to industrial hubs. It was chosen by NC STEM because of significant evidence in innovation, local partnerships, and a desire to prepare students for education and economic demands of the future, specifically in the bio-medical fields.

The Leadership Team in Davie County further engaged their community by developing a STEM blog that serves as a portal for all STEM-related events, updates, and news. Managed by a team identified by the leadership, the content is updated on a regular basis reflecting the ever-changing and evolving work in the community.  One of the more successful uses of the blog was the launch of a county-wide video contest geared toward students and teachers.

The following blog post explained the challenge:

> **"Why STEM is Cool!**
>
> *Do you think STEM (Science, Technology, Engineering, and Math) is cool? Do you want to share your passion for STEM with others? Here is your chance to inspire thousands of people to be more curious, and to care about STEM the way you do: create a short video that explores the question "Why STEM is Cool?"*
>
> *We were seeking videos that are creative, surprising, and "contagious" in terms of spreading your enthusiasm about STEM to others. Videos might explore a STEM concept, show us the wonders of nature, give us a glimpse into the future, show us what scientific discovery has done for us in the past or will do for us in the future, introduce us to a great scientist or engineer, tell us why you think STEM is so cool or simply show us why we should care about STEM in Davie County.*
>
> *Entries Due: December 12th 2010."*

In a month, they received 45 entries from students ranging from elementary to high school. Due to the quality of the submissions, judges were unable to identify just one top contestant and decided to give prizes to a winning video in four categories (elementary, middle school, high school, and teacher). Each winner received an iPod.

Need more information on creating your blog? Visit the Davie STEM Blog at *www.daviecountySTEM.com*.
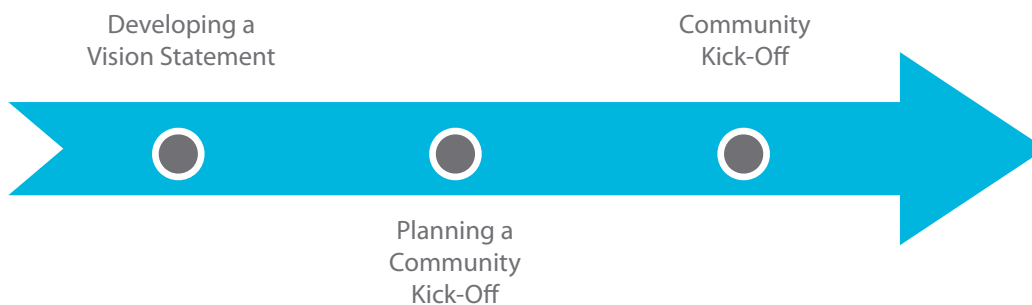
# MODULE 2: COMMUNITY VISIONING

## What to expect in this module?

In this module your community will:

- Create a cohesive community vision statement for STEM education and economic development
- Narrow potential focus areas based on existing assets and needs
- Introduce the engineering design process to community leaders as a method
- Understand the value of networks through engagement with communities that have been involved in the STEM Community Engagement Process

## Timeline

Developing a
Vision Statement

Community
Kick-Off

Planning a
Community
Kick-Off

## What is Community Visioning?

Community Visioning is a process through which a community's voice is heard, documented, and used to jump start action. Your community's vision should clearly capture your realistic aspirations while aligning with the core values and principles of the community. It is essentially the answer to: What aspirations do you have for the world in which you operate and have influence over?

## Why is it important?

Developing a vision statement lays the foundation that will ultimately guide the design and implementation of your innovation, an essential process that clearly defines the purpose and core values that citizens of the community are committed to. Establishing this vision early impacts community buy-in and accountability, which directly correlates to the sustainability of this initiative.

**STEM** *Building a strong foundation through the development of your vision statement directly impacts your ability to move your STEM efforts further, faster.*

A few questions to consider while visioning include:

- What would you like education to look like in your community 10 years from now?

- How will your community prepare its children for college, work and life now and in the future?

- What new ways of thinking will be required for your community to achieve this vision?

- What can you do now to begin this shift in mind-set?

- Who should we engage now to facilitate this outcome?

- What is your theory of action (such as positive deviance, community networks)?

- How will you engage in the ongoing process of identifying community connectors?

- How will you engage your community in the design process related to your education innovation?

- Where are your community strengths and leverage points?  Are they agreed upon?

- What types of needs will your community's vision require?

- What are some potential sources to provide for those needs?  Who can help you obtain the resources?

- What obstacles do you anticipate?

- What data do you need now to make informed decisions about the future?

**Core Purpose**
Reason we exist

**Goal (BHAG)**
Long-term,
audcious goal

**Core Values**
System of
guiding
principles

**VISION**
Ideology
What we stand for
& why we exist

Envisioned Future
What we aspire to become,
achieve, create

**Vision
Description**
Vibrant,
engaging
description of
what it will be
like to achieve
the goal
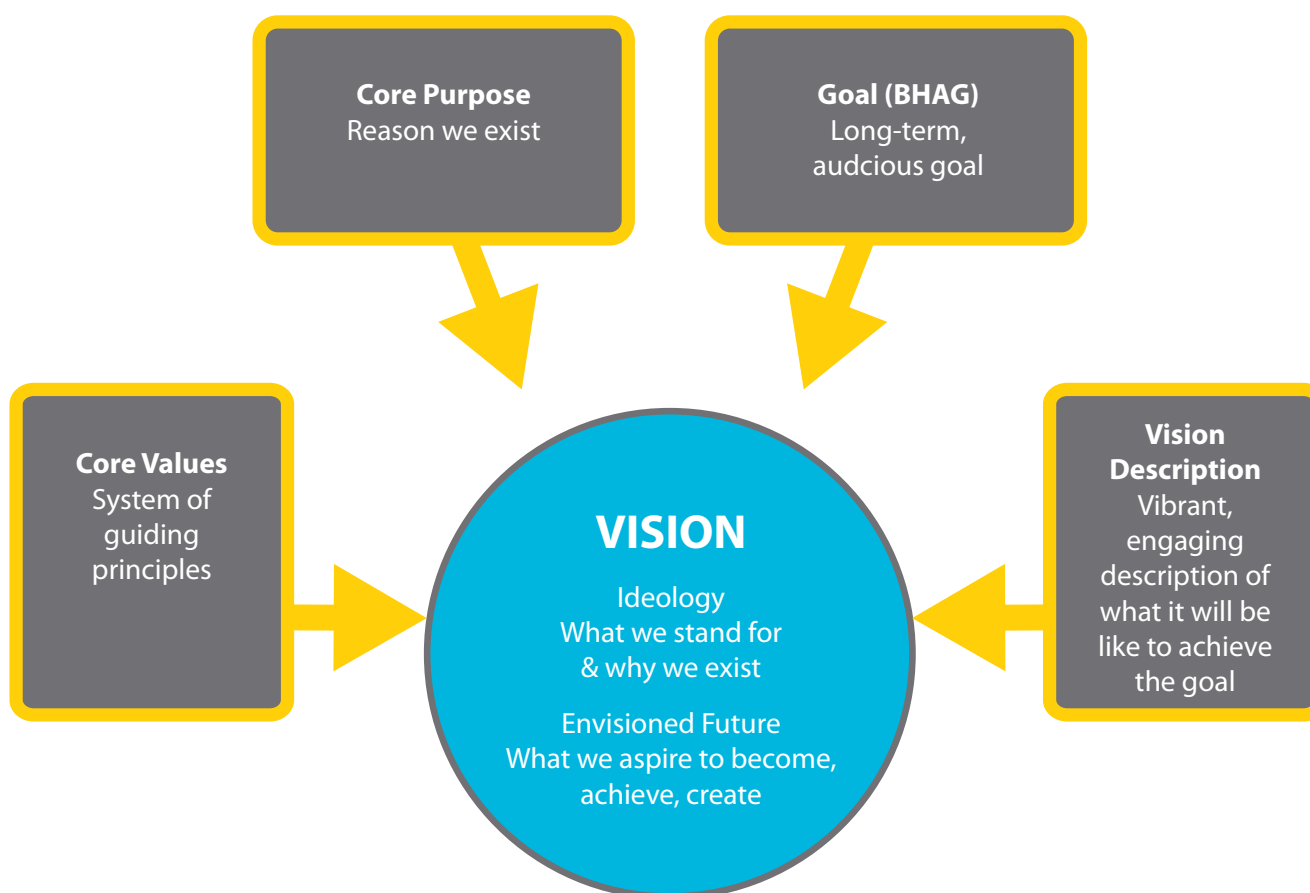
## A Question of Resources

During a better time for our economy, the adage "If you build it, they will come" described the support of valuable community efforts, especially those that impacted education. However, amidst challenging budget deficits and cuts, most communities increasingly are concerned with how to support opportunities to educate students and impact the local economy. So how do you secure resources for Community Engagement in a challenging environment? Our answer is innovation, partnerships and engagement, all which require a more proactive strategy than ever before. There are two choices: 1. Wait until resources present themselves and meet the requirements that come with those resources, or 2. Decide what you are willing to commit to now and and for how long. We suggest No. 2 as the logical step. Remember, committing to design something worthwhile for your community is not the same as committing to build it, buy it, or make it a reality.  By committing now to design something with broad community support keeps an achievable goal in mind while also keeping doors open to future resource partners. Available resources can take on many different forms like re-allocation of existing funds, new funding, or innovative partnerships, just to name a few. We will address resourcing your education innovation later, but recommend you keep this at the forefront of your mind throughout this guide.

## Progress Indicators

| Module | Phase | Indicators | |
|---|---|---|---|
| | | "Soft": Qualitative | "Hard": Quantitative |
| Community Visioning | **Develop a Visioning Statement**<br><br>*Core Outcome:*<br>*Vision Statement that captures the community's vision for the future of STEM education and economic development in their community* | ° Leadership Team members understand the visioning process and are ready to engage the community at-large<br>° Community vision statement that is equitable, scalable & sustainable, innovative, stem-focused and collaborative<br>° Clear outlook on what success looks like in ten years? | ° One shared vision for the future of the community's children and economy |
| | **Planning a Community Kick-off**<br><br>*Core Outcome:*<br>*Plan a Community Kick-off Event tailored to the needs of your community and successfully capturing the community voice for the future* | ° Comprehensive Community Kick-off implementation plan – outlines objectives, logistics, format, etc<br>° Knowledgeable Leadership Team prepared to engage the community at-large in the visioning process | ° At minimum, three communications to community-at-large regarding the community kick-off event – save-the date, invitation, reminder(s) |
| | **Community Kick-off**<br><br>*Core Outcome:*<br>*Provide an opportunity for the community-at-large to learn about the new initiative and share their vision for the future* | ° Attendance of diverse community members that are deeply engaged in the visioning process by openly share their aspirations for the future<br>° Comprehensive analysis of the data collected at community kick-off event to capture the general community voice<br>° Community Kick-off data analyzed in a timely manner in order to impact the vision statement<br>° Revised vision statement that addresses key findings from the Community Kick-off | ° One representative from each sector present at the community kick-off event unity members that participated in event |
| | **Community Engagement Focus: Your Blog**<br><br>*Core Outcome:*<br>*Further engage the community-at-large by way of technology – websites, blogs, etc* | ° Virtual tools (website, blog, twitter, facebook, etc) that share updates and inform community of initiative<br>° Management team identified to supervise and update content | ° Increased web traffic –increasing number of web hits following analysis over a period of time (day, week, month) |

## Phases of Community Visioning

### Developing a Vision Statement

**Where Are You Now?**
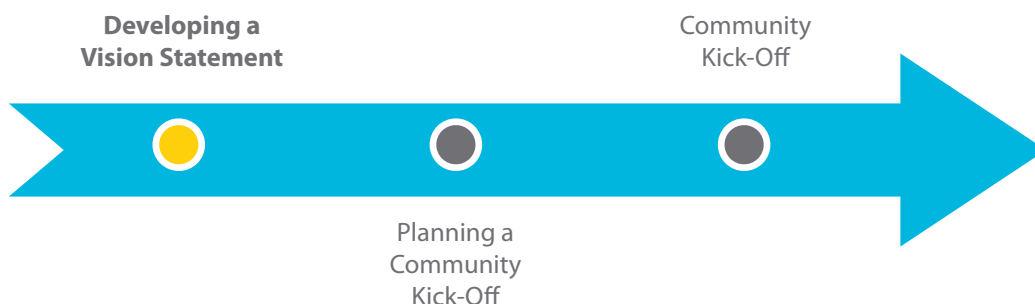


**Goal**: To develop a vision statement that captures the future of STEM education and economic development in your community.

**Overview**: Members of the STEM Leadership Team will create a team vision statement for STEM education and economic development for their community. This vision statement will then be communicated to the public and vetted. Note the vision statement is a flexible document that is subject to change as it is shared with the larger community, partners, and additional stakeholders.

**Materials/Tools**

- Visioning Tool (see page XX in STEM Materials and Toolkit)
- Areas of Innovation (see page XX in STEM Materials and Toolkit)
- Sample Visioning Slide Deck (see page XX in STEM Materials and Toolkit)

**QUICK TIP**

*Be creative! Create a tagline or motto associated with your vision and use it as a vehicle to share the vision and focus of your efforts with the community at-large.*

**Action Items**

| Facilitator | Leadership Team | Community at-large | Action Item |
|:---:|:---:|:---:|---|
| ✓ | | | Introduce areas of innovation as areas to focus efforts, education innovation and measurement |
| ✓ | ✓ | | Schedule meeting to complete a visioning exercise: secure logistics, agenda and materials |
| ✓ | | | Facilitate visioning meeting to develop comprehensive vision statement |
| ✓ | ✓ | | Create team vision statement for STEM in your community |
| | ✓ | ✓ | Share vision with community and receive community input |
| | ✓ | | Finalize shared vision based on community feedback |
| | ✓ | ✓ | Share vision statement with community at-large |

## Where do you want to be in 1, 3, and 10 years?

What are your dreams and aspirations for your children, community, and economy? The vision statement you develop should touch on these areas and fuel the engagement of your community going forward. There are many ways to approach your visioning exercise; describing short-term intentions or declaring long-term goals of grandeur. The choice is yours, but one common thread is that you capture the essence of where you want to be in 1 year, 3 years, or even 10 years.

## In Practice: Fortune 500 Vision Statement Samples

The following are examples of vision statements released by major U.S. companies:

**Amazon**
*"Our vision is to be earth's most customer-centric company; to build a place where people can come to find and discover anything they might want to buy online."*

**Toys 'R Us**
*"Our vision is to put joy in kids' hearts and a smile on parents' faces."*

**Nike**
*"To bring inspiration and innovation to every athlete\* in the world" (\* If you have a body, you are an athlete)*

**McDonald's**
*"McDonald's vision is to be the world's best quick service restaurant experience. Being the best means providing outstanding quality, service, cleanliness, and value, so that we make every customer in every restaurant smile."*

**Coca Cola**
*"Our vision guides every aspect of our business by describing what we need to accomplish in order to continue achieving sustainable growth.*

- People: Being a great place to work where people are inspired to be the best they can be.
- Portfolio: Bringing to the world a portfolio of quality beverage brands that anticipate and satisfy people's desires and needs.
- Partners: Nurturing a winning network of customers and suppliers, together we create mutual, enduring value.
- Planet: Being a responsible citizen that makes a difference by helping build and support sustainable communities.
- Profit: Maximizing long-term return to shareowners while being mindful of our overall responsibilities."*

## In Practice: STEM Community Vision Statement Samples

The following are vision statements developed by North Carolina STEM Communities:

**Cabarrus/Rowan Collaborative**

To develop a prosperous and global community of innovators, explorers and critical, adaptable and creative thinkers committed to lifelong learning.

**Davie**

To increase student scores and proficiency in STEM-related areas, graduate students who are more prepared to enter STEM employment upon leaving high school, increase numbers of students pursuing post-secondary STEM careers, instill passion for 21st Century STEM teaching and learning in our teachers and students, and ultimately realize the more macro-environmental benefits of a concentration of STEM talent in Davie County.

**Ft. Bragg Region**

Foster regional economic development by engaging all segments of the community:
– in creating a culture that values STEM-related knowledge,
– in preparing our students to be lifelong learners, and
– in educating the regional workforce with the 21st century skills to successfully compete in a global economy.

To lead the state in the production of a STEM-educated, globally-competitive workforce, and to use STEM technology to transform regional academic institutions to meet the demands of a 21st century global economy.

**Lenoir**

Improve STEM education and economic opportunity by offering student more experiential learning opportunities.
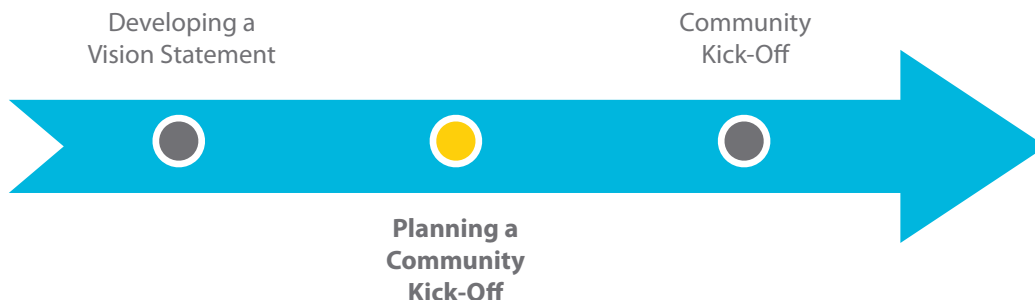
**QUICK TIP**

*Design your Community Kick-off to meet the specific needs of your community. Use the enclosed protocol as a guide but make this event your own!*

# Planning a Community Kick-Off

**Where Are You Now?**

Developing a
Vision Statement

Community
Kick-Off

**Planning a
Community
Kick-Off**

## Planning your Community Kick-Off

**Goal:** To plan a Community Kick-off event tailored to the needs of your community and successfully capturing the community voice for the future.

**Overview:** Community Kick-off events are important opportunities for community members to have their voices heard and for opinions to be expressed. Equally important, is the preparation necessary to successfully plan and implement an event of this magnitude and reach. Known to take at least six weeks to plan, a Community Kick-off can take on a variety of different forms to serve the needs of your community. You may decide to host a large community-wide event at a local gathering place or host smaller intimate sessions with some culminating event.

**QUICK TIP**

*Media, Media, Media! Invite your local television stations, radio, newspapers, any outlet with a platform to share your vision with the public.*

**Materials**

- Community Kick-Off Protocol (see page XX in STEM Materials and Toolkit)

**Action Items**

| Facilitator | Leadership Team | Community at-large | Action Item |
|:---:|:---:|:---:|---|
| ✓ | | | Introduce purpose, function of Community Kick-off to dommunity leaders |
| ✓ | ✓ | | Identify community partners that will assist in visioning exercises |
| ✓ | ✓ | | Decide format, date and location that will best serve the community |
| ✓ | ✓ | | Develop agenda and secure speakers and special guests |
| ✓ | ✓ | | Use asset map/SWOT analysis to develop a list of organizations to reach out to for invitation |
| ✓ | ✓ | | Provide details to media outlets (blogs, networking sites, local news and newspaper) |
| | ✓ | | Confirm logistics (location, food, technology, etc.) |

## Community Kick-Off

**Where Are You Now?**

Developing a
Vision Statement

**Community
Kick-Off**

Planning a
Community
Kick-Off
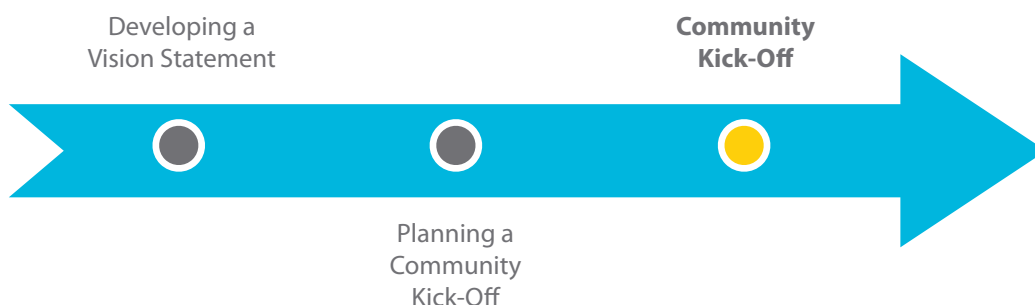
**Goal**: To provide an opportunity for the community at-large to learn about the new initiative and capture their vision for the future.

**Overview**: Community Kick-off events are intended to achieve three goals:

- Provide an overview and a more in-depth discussion of the project.
- Offer an opportunity for voices to be heard.
- Collect demographic and socio-metric information about participants in your community.

**Materials**

- Community Kick-Off Protocol

**Action Items**

| Facilitator | Leadership Team | Community at-large | Action Item |
|:---:|:---:|:---:|---|
| ✓ | ✓ | | Confirm logistics and prepare materials for community kick-off |
| ✓ | ✓ | ✓ | Community Kick-Off event |
| ✓ | ✓ | | Record and archive community feedback from Community Kick-Off event |
| ✓ | ✓ | | Facilitate meeting to gather and analyze data collected from Community Kick-off event |
| ✓ | ✓ | | Document decisions made that map to the feedback from Community Kick-off |
| ✓ | ✓ | ✓ | Share up-to-date decision and actions with community at-large |

## In Practice: Community Visioning

*CASE STUDY: "400 people in a thunderstorm" – Davie County, N.C.*

Davie County hosted one of the most successful Community Kick-Off events in North Carolina. Despite less than ideal weather, more than 400 community members traveled to a local church to learn more about the STEM initiative and share their vision for the future. The agenda featured an introduction by the president of The Mebane Foundation and presentations by a pioneer researcher in regenerative medicine and the chief executive officer of Wake Forest University Baptist Medical Center. The STEM Leadership Team took advantage of all media outlets to promote this event including their STEM Blog, local news and newspapers, and the NC STEM website.

To see the introductory message and video, visit this link.

### Community Engagement Focus: Your Blog

To further engage your community in this process, consider creating a website or blog to continue input and engagement, show a path to future, and share information. Currently, there are many user-friendly platforms to host your blog such as Wordpress, Blogger, or Google Sites. Such an undertaking is usually successful when a team is identified to manage and update the site on a regular basis. This site also can serve as a data capturing tool for project milestones and successes.

The following are examples of community based blogs and websites:

- Davie County STEM
- Cabarrus-Rowan STEM
- STEM East
- WCPSS STEM Schools Collaborative

# MODULE 3: INNOVATION DESIGN

## What to expect in this module?
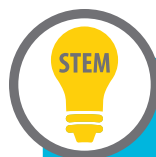
In this module your community will:

- Begin an engineering design process to develop an Education Innovation Design Plan (EIDP) that maps to the 5 Design Principles: equitable, scalable and sustainable, innovative, stem-focused, and collaborative.

- Develop a network of individuals, assets, and other resources to the drive the design of a 21st century education innovation.

- Engage more community stakeholders by building and sharing an innovative design plan that impacts STEM education and economics.

## Timeline



Developing an Education Innovation Design Plan • Community Charrette Process • Critical Design Review • Commitment to Innovation
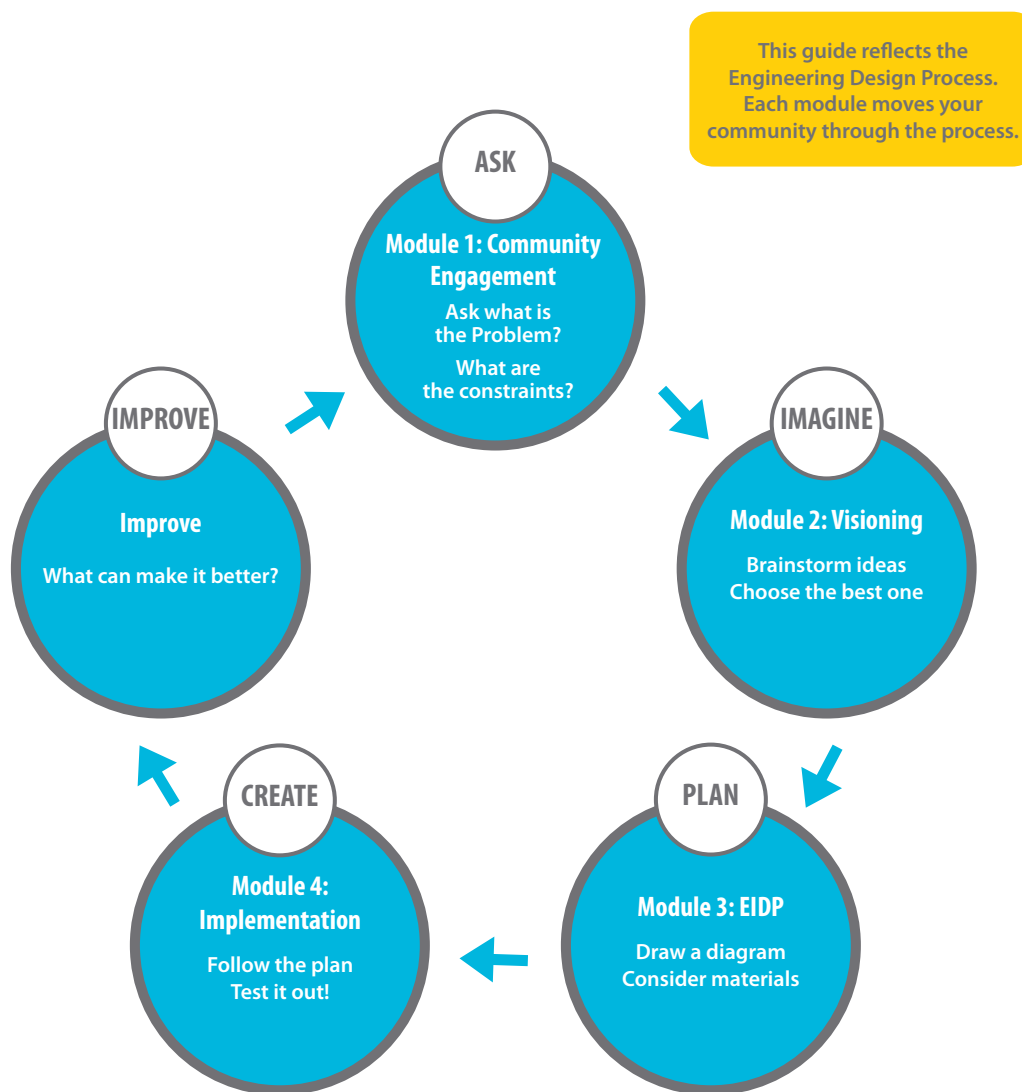
## Introduction to Innovation Design

While earlier modules required more theoretical and visionary planning, Innovation Design will be more structured as you move towards making your vision a reality. The proposed next steps in the STEM Community Engagement process will lead to the development of your Education Innovation Design Plan (EIDP). Though each community is different, utilizing an engineered-based design process to guide your work will ensure your innovation is replicable and scalable. The design process is a cyclical-problem solving strategy that builds critical thinking skills and guides the development of clear, reasoned, and purposeful solutions. The product you will conceive, develop, and test will be your plan for sustainable innovation within your community. There are many versions of this process, but for the purposes of this guide, we will utilize the approach provided by the N.C. State University College of Engineering. This five-step process consistently helps us to ask questions, plan, do, refine and ask again.

*STEM: Utilizing an engineer-based design process to guide your work will ensure your innovation is replicable and scalable.*

In this module you will map your design to the fundamental design principles and engage your design teams and other community representatives in this final design of your EIDP. The EIDP is a major milestone of the STEM Community Engagement process and serves as the community's reference guide for ongoing design and implementation of each innovation.

This guide reflects the Engineering Design Process. Each module moves your community through the process.

**ASK**

**Module 1: Community Engagement**

Ask what is the Problem?

What are the constraints?

**IMAGINE**

**Module 2: Visioning**

Brainstorm ideas
Choose the best one

**IMPROVE**

**Improve**

What can make it better?

**CREATE**

**Module 4: Implementation**

Follow the plan
Test it out!

**PLAN**

**Module 3: EIDP**

Draw a diagram
Consider materials

## Engineering Design Process
### A Series of Steps that Leads to the Development of a New Product or System

You can start at any step in the process but skipping the first question may impact the sustainability of your community innovation. After you improve your design once, you might want to begin it all over again to refine your solution, or focus on one particular area.

As discussed in earlier modules, a cornerstone of this work is the *5 Design Principles* by which all stakeholders are unified. The design principles provide parameters for development of your innovation and provide clarity on the goals of student-centered teaching and learning.  Your innovation design must support the broad purpose of preparing your community's youth for college, career, and life.
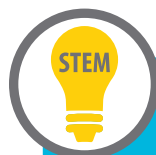
These principles should be a guide to your community as you design your innovation:

- **Equitable:** Make STEM literacy and economic opportunity attainable for <u>ALL</u> North Carolina students.
- **Scalable & Sustainable:** Drive educational innovation and economic alignment in a coordinated and methodical way.
- **Innovative:** Give communities the tools needed for transformative changes to STEM education
- **STEM-Focused:** Empower and support a culture that nurtures and supports innovative STEM professionals, and brings businesses, schools, nonprofits, and other community institutions together to prepare students and communities for 21st century jobs.
- **Collaborative:** Develop a statewide network for STEM excellence through local, state and national networks and evidence-based research.

The design should also be in alignment with vital areas of education innovation that the U.S. currently struggles with; these are known as areas of innovation. These inter-related areas should not be considered in a vacuum.

In order to prepare all students to be college and career ready and to maximize the impact of education innovations within the STEM network, communities will focus on one of the following areas:

*Your innovation should build on the strengths of the region, adding value economically and improving accessibility of education for all students*

1. Empower educators and communities to build the STEM Pipeline
2. Common Core Standards and innovative assessment for readiness of college and careers
3. STEM content and 21st century technology
4. Experiential learning and project/problem-based curriculum
5. Data systems and accountability
6. Teaching and learning in designed environments (innovative schools/classrooms)

**Potential Outcomes**

Understanding and using these design principles, each community will partner to direct a collaborative process that ensures community ownership and sustainability that allows for the development of a framework for truly innovative, additive outcomes. This will ensure a shared vision for STEM education connected to a perpetual process, and each community outcome may appear unique and may be as varied as these hypothetical outcomes:

- An innovative school on the campus of a large high-end aerospace manufacturing facility, including experiential learning and regulated internship/co-op opportunities as a part of rigorous STEM skill attainment.

- An innovative path to the entire region taking innovative STEM curriculum in a hybrid (online/onsite) environment using cloud computing and low cost net books (thin client devices) for cost-effective delivery for all students; building on the virtual world expertise in the region, for more rigorous, accessible STEM learning.

- A model for innovating the 21st century teacher, combining multiple content, computing, and subject matter approaches to deeply evaluate impact on STEM approaches.

- A STEM Learn and Earn Program on a research-one higher education campus that forges the pathway for higher education's campus and the high school to merge.

These hypothetical outcomes are attainable and can be a lever for sustainable education with community support.

## Progress Indicators

| Module | Phase | Progress Indicators | |
|---|---|---|---|
| | | "Soft": Qualitative | "Hard": Quantitative |
| **Innovation Design** | **Leadership Design Sessions(s)**<br><br>*Core Outcome:*<br>*Guide and inform leadership team through the engineering design process to design a education innovation for their community – a pathway to transform their vision into a reality* | ° Leadership Team is knowledgeable about Areas of Innovation and Design Principles – can apply to innovation design<br>° Design statement aligned with the 5 Design Principles and vision for the community | ° At minimum, a quorum of the STEM Leadership Team present all Leadership Design Sessions<br>° At minimum, one representative from each sector present at all Leadership Design Sessions – responsible for communicating with general sector population |
| | **Develop an Education Innovation Design Plan**<br><br>*Core Outcome:*<br>*Compile documents, ideas and strategies to create a Education Innovation Design Plan (EIDP)* | ° Theory of Change that aligns with 5 Design Principles and reflects the voice of all segments of the community<br>° Education Innovation Design Plan (EIDP) that outlines the design focus and structure<br>° EIDP aligned with College Ready and Career Metrics (Collaborative Scorecard) | ° One shared design for the future of the community's children and economy |
| | **Community Charrette Process**<br><br>*Core Outcome:*<br>*Vet the Education Innovation Design Plan (EIDP) with the community-at-large* | ° Community participants encouraged to problem solve by concentrating on specific design problems and present solutions<br>° Translate community voices into the final Education Innovation Design Plan | ° At minimum, five community representatives from each sector present at Charrette meeting – responsible for communicating with general sector population |
| | **Critical Design Review**<br><br>*Core Outcome:*<br>*Conduct a "stress test" of the EIDP to inform the final stages of development and redesign* | ° Diverse panel of experts convened to add value to "stress test" of design<br>° Revised Education Innovation Design Plan based on the recommendations outlined in the Critical Design Review<br>° Document | ° At minimum, five trusted partner present at Critical Design Review – responsible for communicating with general sector population |
| | **Memorandum of Understanding**<br><br>*Core Outcome:*<br>*Clarify commitments, goals and objectives of all partners in this process* | ° Formal partnership agreements with investors that set expectations of engagement – includes all forms of support direct, in-kind and other resources<br>° Fiscal agent identified to manage financial investments | |
| | **Community Engagement Focus: Small Events, Big Impact**<br><br>*Core Outcome:*<br>*Continue to engage your community by facilitating events or meetings highlighting STEM and objectives of this engagement process* | ° Small events to showcase progress of initiative and to further engage members of the community in the process<br>° Pathway for attendees to be engaged – collect contacts at events for future communications | ° At minimum, one small community event each quarter to highlight STEM and further engage community in the process<br>° Increased web traffic following each event–increasing number of web hits in days/weeks following event |

## Phases of Innovation Design

### Developing a Education Innovation Design Plan

**Where Are You Now?**



**Goal:** To develop a comprehensive document projecting the impacts of your community's innovation while clarifying the design structure, assumptions, and strategies.

**Overview:** The Education Innovation Design Plan (EIDP) is a major milestone of the STEM Community Engagement process and serves as the community's guide for ongoing design and implementation of each community's approach to innovation across its stakeholder groups. While the EIDP is not a tactical implementation plan, it should set the framework, governance, and focus for the ongoing process of implementation, measurement, and refinement of your innovation. The EIDP may be presented in a variety of formats but must address the following: community design challenges and area(s) of innovation; alignment with design principles; evidence and measurements to ensure ongoing success; and timeline, budget, and commitment to sustain the education innovation. Based upon your innovation, the plan will add value for the region, state, and nation in alignment with the *5 Design Principles* and should identify your STEM community's design challenges and area of optimization.

**Design Challenges**

- What are the education needs of your community?
- What is the gap to be filled by this work?
- How is the gap related to student achievement?
- How is this gap related to the workforce and economic development needs of your community/region?
- What will you start, stop and continue doing?
- Who will be impacted and how?

**Materials/Tools**

- Education Innovation Design Plan Template (see page XX in STEM Materials and Toolkit)

- EIDP Milestones (see page XX in STEM Materials and Toolkit)

- EIDP RFI (see page XX in STEM Materials and Toolkit)

- Areas of Innovation (see page XX in STEM Materials and Toolkit)

- Five Design Principles (see page XX in STEM Materials and Toolkit)

- STEM education/innovation slide deck (TIES) (see page XX in STEM Materials and Toolkit)

- Design Wheel (see page XX in STEM Materials and Toolkit)

**Action Items**

| Facilitator | Leadership Team | Community at-large | Action Item |
|---|---|---|---|
| ✓ | ✓ | | Schedule a series of design session(s) with Leadership Team to focus on the following key topics:<br><br>• Design tools and process (engineering design process, areas of innovation, etc)<br>• Presentations from experts in engineering design - potential innovations and pilots<br>• Brainstorming design and platform of innovation<br>• Development of elements of Education Innovation Design Plan |
| ✓ | ✓ | | Stress test your design – socialize prototype against the 5 Design Principles |
| ✓ | ✓ | | Schedule follow-up design sessions to move forward with design and finalize draft of the Education Innovation Design Plan |

## Community Charrette Process

**Where Are You Now?**

Developing
an Education
Innovation Design
Plan

Critical Design
Review

**Community
Charrette Process**

Commitment to
Innovation
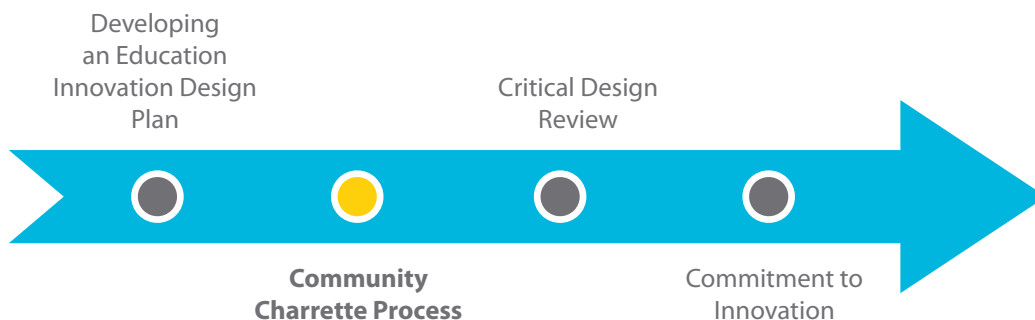
**Goal:** To present the EIDP to the community at-large for vetting through a Charrette process.

**Overview:**  Charrette is a term and process borrowed from the architectural community that allows for maximum participation in idea generation, without compromising the quality or effectiveness of the brainstorming. The Charrette Protocol involves organizing people into several small groups, each of which brainstorms ideas one-after-the-other until everyone involved has had a chance to contribute. In the process of developing your EIDP, use the Charrette to "stress test" your design with member of your community. This exercise will result in a stronger design that meets the needs of all citizens of your community.

Other benefits of this process include:

- Effective use of time because many issues can be discussed at the same time
- Improved buy-in from stakeholders who have the opportunity to contribute their ideas on each issue
- Encouragement of high-quality options because the most popular ideas are polished with each round of discussion
- Elimination of stalled discussions because new people can progress an issue on each round


Underlying the successful use of the Charrette are two fundamentals:

- Individuals or groups working together can usually produce better work than individuals or groups working in isolation.
- There is no piece of work that with more time, thought, and effort couldn't be improved.

**Materials/Tools**

- Community Charrette Protocol (see page XX in STEM Materials and Toolkit)

**Action Items:**

| Facilitator | Leadership Team | Community at-large | Action Item |
|:---:|:---:|:---:|---|
| ✓ | ✓ | | Leadership finalize logistics to host Charrette event |
| ✓ | ✓ | | Send communication to community at-large – ensuring appropriate number of representatives from each sector have been invited to attend |
| ✓ | ✓ | ✓ | Facilitate Charrette event for the community to review the draft EIDP and give feedback |
| ✓ | ✓ | | Collect and analyze feedback from Charrette event |
| ✓ | ✓ | | Revise draft and finalize EIDP to reflect community feedback from Charrette event |

## Critical Design Review

**Where Are You Now?**

Developing an Education Innovation Design Plan

**Critical Design Review**

Community Charrette Process

Commitment to Innovation

**Goal:** To provide a mid-stream assessment of the readiness of the design and inform the final stages of the development process. To conduct a "stress test" to reveal assumptions that may not be valid and risk mitigation.

**Overview:** Your community has completed visioning and design exercises and is now moving into the Review and Feedback Process. This process is designed to take your Leadership Team and community into a "deep dive" of your EIDP – activities designed to prompt questions, guide planning, challenge assumptions, and lead to the redesign/refinement of your EIDP. This process of questioning, redesign, and refinement is critical before investing the time, talent, and treasure to create a business and implementation plan.

**Materials/Tools**

- Critical Design Review Protocol (see page XX in STEM Materials and Toolkit)

**Action Items**

| Facilitator | Leadership Team | Community at-large | Action Item |
|:---:|:---:|:---:|---|
| ✓ | ✓ | | Identify trusted partners with the expertise to critically review and provide feedback on the design of your prototype |
| ✓ | ✓ | | Invite trusted partners to participate in a critical design review of your EIDP |
| ✓ | ✓ | | Identify guidelines and parameters of critical design review format – share protocol with all participants prior to meeting |
| ✓ | ✓ | | Facilitate critical design review of EIDP using finalized protocol |
| ✓ | ✓ | | Analyze response and revise document to reflect feedback |

## Commitment to Innovation

**Where Are You Now?**

Developing
an Education
Innovation Design
Plan

Critical Design
Review

Community
Charrette Process

**Commitment to
Innovation**

**Goal:** To clarify goals and objectives of partners within communities, to strengthen relationships within communities and investors; and to strengthen your policy and legislative agenda.

**Overview:** At this point you have convened a cross-sector leadership team to drive the deep engagement of your community members, envisioned a 21st century education innovation, and developed an Education Innovation Design Plan that demonstrates the vision for your prototype. As you prepare to build your business plan to sustain and scale this work beyond the borders of your community, you should document partnerships and rules to your engagement in order to ensure a productive platform to work. This documentation may be in the form of a Memorandum of Understanding (MOU), a document that sets forth the general terms and conditions of proposed relationships among all parties and how these entities will coordinate and invest their resources and efforts to support the ongoing development of your innovation through implementation and potentially beyond.

Elements of this agreement may include:

- Investments – in-kind or direct
- Fiscal Agent – local entity to coordinate and manage all assets
- Communications – cohesive marketing and branding of the initiative
- Business Plan – development of plan to gain further investment or support
- Parameters of Engagement – includes relationship of parties and a completion/termination  clause

**Materials/Tools**

- Memorandum of Understanding Template (see page XX in STEM Materials and Toolkit)

**Action Items**

| Facilitator | Leadership Team | Community at-large | Action Item |
|:---:|:---:|:---:|---|
| ✓ | ✓ | | Identify and document partners that will coordinate and invest resources in your innovation through implementation |
| ✓ | ✓ | | Outline all elements of partnerships related to your work into a cohesive agreement |
| ✓ | ✓ | | Formalize partnership agreements by signing the commitment document |

## Community Engagement Focus: Small Events, Big Impact

*Take a break from visioning and design; it's time to show off all of your hard work!*

To continually engage and reach out to the community, strive to maintain a level of transparency and accessibility as you progress through these final stages of development and design. To accomplish this consider hosting intimate community gatherings that have a far reaching impact.

The following are two examples of impactful events that engaged a community in STEM-related activities:

### "Lift off Lenoir" – Lenoir County, N.C.

STEM East in Lenoir County partnered with the Community-Campus Partnership (CCP) at UNC Chapel Hill and Spirit AeroSystems to officially launch "Lift off Lenoir" at a community event hosted at Spirit AeroSystems. The "Lift of Lenoir" project provided Lenoir County elementary students the opportunity to experience North Carolina's first portable, digital planetarium and an innovative space-themed education program. This public event not only showcased this valuable asset but provided an opportunity to inform the community at-large of immediate impacts of the efforts of STEM East.

### Kasey Kahne Foundation "Five Kahne" – Rowan/Cabarrus County, N.C.

NASCAR driver Kasey Kahne organizes an annual 5K charity run and kid's dash in uptown Charlotte the day following the fall NASCAR Sprint Cup race at Charlotte Motor Speedway. In 2010 at the first annual run, the Kasey Kahne Foundation aimed to raise awareness for the grand opening of the new Ronald McDonald House in addition to establishing a fund for STEM Field Trips to the NASCAR Hall of Fame for students associated with the local STEM Community. This STEM educational experience included lessons from professionals making tangible connections between the racing industry and STEM education. Hosting a 5K charity run is an ideal community event to spread awareness and rally a community around one cause or initiative, as evident by approximately 300 participants raising more than $12,000 for charity. The first field trips took place in January 2011, helping hundreds of seventh graders from local middle schools and raising awareness for the local community's work and its partners.

## In Practice: Innovation Design

### "Teacher's don't have to leave to learn": STEM Cell Infusion – Davie County, N.C.

Davie County STEM believes that a direct pathway to improving education for all kids is through innovative professional development. Who says teachers can't learn in the classroom? STEM Infusion is designed to develop and implement dynamic solutions to the systemic challenges of providing high-quality 21st Century STEM professional development for existing and beginning classroom teachers through technology integration. The model forms small professional learning communities or "STEM Cells" that are populated with master, student, and first-year teachers who will, with the support of a additional resources, intervene in classrooms to model delivery of STEM curricula and instruction as well as provide individual teacher professional development. By implementing this model, Davie County Schools hope to increase student scores and proficiency in STEM-related areas, graduate students who are more prepared to enter STEM employment upon leaving high school, increase the number of students pursuing post-secondary STEM careers, instill passion for 21st century STEM teaching and learning in teachers and students, and ultimately realize the more macro-environmental benefits of a concentration of STEM talent in Davie County. Cognizant of the need to promote and ensure long-term sustainability, Davie County Schools has forged partnerships with local business and industry, post-secondary institutions, and many economic development and philanthropic organizations.

### Lenoir County STEM Hub: Lenoir County, N.C.

Following a Community Visioning and Design Process, STEM East in Lenoir County developed a concept for a novel regional STEM Hub. The primary purpose of the Lenoir County STEM Hub will be to provide a foundational platform of collaboration to impact the number of college and career ready students qualified to meet the 21st century needs of the local business industry. The STEM Hub was used as a trusted space and platform of collaboration to design and launch STEM-focused applications that address targeted needs in the community.

Following a Community Visioning and Design Process, Lenoir County developed as a unique regional STEM Hub formed through public/private partnerships. The primary purpose of the Lenoir County STEM Hub, now called STEM East, is to provide a foundational platform of collaboration to impact the number of college and career ready students qualified to meet the 21st century needs of the local business industry. These STEM Learning Labs give students the tools to develop critical thinking skills needed to function in 21st century careers.

These efforts will result in the establishment of four STEM Learning Labs in four middle schools that have a high population of low/moderate income children in the counties of Lenoir, Craven, Wayne, and Jones. Each local school district will provide the required classroom space to house the STEM Learning Lab and will commit resources to equip and sustain the lab. This project is expected to serve as a model for developing more fixed labs throughout the region and possibly generate interest in the development of mobile Labs to serve a greater number of students and counties in the eastern region.
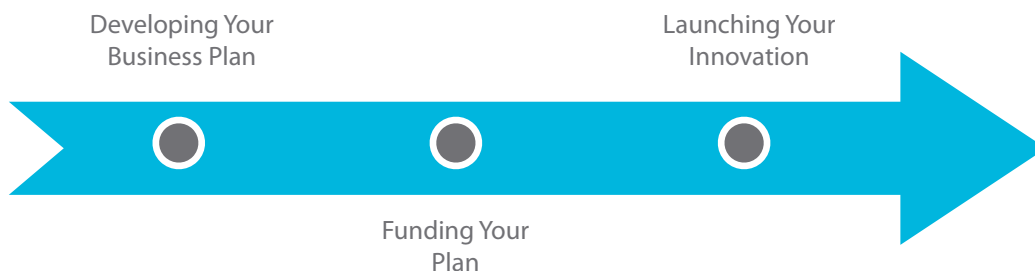
# MODULE 4: BUSINESS PLANNING AND IMPLEMENTATION

## What to expect in this module?

In this module your community will:

- Develop a comprehensive business plan to include organizational governance and sustainability
- Develop a one, two, or three-year implementation plan outlining benchmarks and roles in the design roll-out
- Engage with partners and broader stakeholder groups
- Transition to a more  action-oriented focus

## Timeline

Developing Your
Business Plan

Launching Your
Innovation

Funding Your
Plan

## Introduction to Business Planning & Implementation

The value of business planning lies in the process of bringing together resources and actionable priorities to your community to implement the vision and plan that will transform the lives of your children and the place you call home. During the Business Planning and Implementation Phase, STEM Communities transition from the voluntary efforts in previous modules to more formal, collaborative efforts aimed toward bringing an evidence-based vision to the market. The business plan will serve as a means to clearly define resources currently available and identify gaps that  must be removed (or reduced) in order to implement the innovation. The format and content of your business plan can vary from a simple "back of the napkin" model to a more detailed plan with clear short and long-term actions – ultimately the approach you take should represent the uniqueness of your community's needs and innovation model. In this tool, elements of the business plan will be presented in a detailed format.

To assist in the development of the business structure and implementation, consider utilizing the following external resources:

- **Embedded Network Staff:** "On the ground" staff members from trusted network partners involved in the deployment of STEM Community initiatives.

- **Technical Assistance Partner (organization with content and research capacity):** Deploys a set of services and consulting to STEM Community for knowledge dissemination, training, and gateway to best practice tool sets.

- **Public Policy/Research Affiliate (organization with aligned mission and proven capacity):** Provides fact-based examinations of local and state workforce development needs and translates this into policy and legislative recommendations that also can relate to public awareness and influence campaigns.

- **In-Residence Appointments (unique expertise to create knowledge within others & build network capacity):** Peer-recognized subject matter experts charged with disseminating and advancing the value of STEM education to network affiliates through personal participation and specialized technical and managerial work, mentoring and/or research activities.

## Progress Indicators

| Module | Phase | Progress Indicators | |
| --- | --- | --- | --- |
| | | "Soft": Qualitative | "Hard": Quantitative |
| **Business Planning and Implementation** | **Business Plan Development**<br><br>*Core Outcome:*<br>*Develop a comprehensive business plan – includes governance structure and sustainability plan* | ° Comprehensive business plan that addresses key elements of design and sustainability<br>° Comprehensive financial plan including source(s) for initial operating costs - use local resources (30-40%) | ° One shared plan for the development and sustainability of the innovation that will impact the future of the community's children and economy |
| | **Implementation Plan Development**<br><br>*Core Outcome:*<br>*Develop a one to three year implementation plan – outlines benchmarks and leadership roles* | ° Local support by way of investment in innovation design and implementation<br>° Broad knowledge and support of the initiative in the community | ° One shared plan for the implementation of the innovation that will impact the future of the community's children and economy |
| | **Launching Your Innovation**<br><br>*Core Outcome:*<br>*Successfully launch your innovation with complete fidelity to the strategy outlined in the implementation plan* | ° Innovation launch that has wide spread visibility to the community | ° Set by your team |
| | **Measuring Success: Collaborative Scorecard**<br><br>*Core Outcome:*<br>*Measure the impact of your innovation locally, statewide and nationally* | ° Leadership team prepared to access metrics outlined in the collaborative scorecard | ° Set by your team |

## Phases of Business Planning and Implementation

### Developing Your Business and Implementation Plan

**Where Are You Now?**

Developing Your
Business Plan

Launching Your
Innovation

Funding Your
Plan
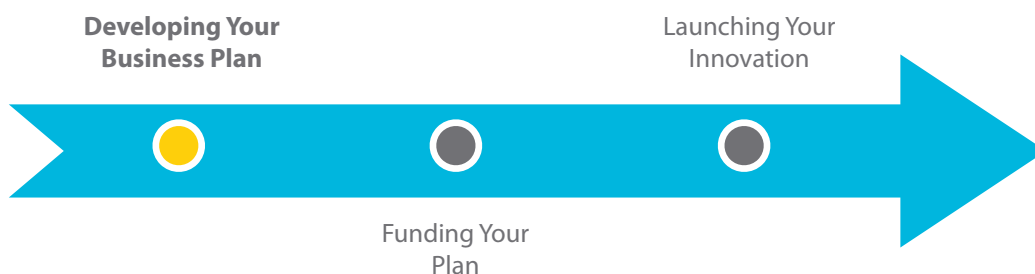
**Goal:** To document the Education Innovation Design Plan and roll-out the formal business and implementation plans.

Key objectives include:

- Help activate near and long-term investments of resources from partners
- Help your STEM Community articulate its vision and engage in strategic planning in business planning phase
- Help assesses goals, market potential, and competitive advantage
- Help create, communicate, and gain internal and external resource investment in an innovative education prototype with value to the region, state, and nation

**Overview:** Developing focused business and implementation plans will provide the foundation for a more sustainable, equitable, and scalable prototype. The Business Plan should clearly define your innovation model and business structure while outlining near and long-term resource investments.

Key elements of your plan should address the following:

- **Business Model:** Evidence of a sustainable model that conserves and maximizes resources – in addition to evidence of local support from other education/government organizations
- **Alignment:** Innovation design in full agreement with the core values of the design process – *Equitable, Sustainable, Scalable, STEM-Focused, and Collaborative*
- **Governance Plan:** Leadership structure that defines roles, responsibilities and daily processes
- **Sustainability Plan:** Financial resource plan to ensure sustainability of innovation
- **Partnerships:** Who are your local, state and national partners? How are they engaged?
- **Market Potential:** Evidence of existing and increasing collaboration among organizations and leaders
- **Competitive Advantage:** Evidence of an issue and a new, improved approach to a solution

Now that the business plan has defined what and why; it is now time to decide the when, where and how? The Implementation Plan should answer these questions by outlining strategies and action items that achieve the objectives of the Business Plan.

Key elements of your plan should address the following:

- **Project Plan:** What will you do, when, and by whom?
- **Competitive Landscape:** Evidence that efforts address key community characteristics and demographics
- **Leadership Team:** Evidence of flexible, knowledgeable leadership, use of feedback and data in making decisions and results-oriented behavior
- **Contingencies**

**Materials**

- Business Plan Template (see page XX in STEM Materials and Toolkit)
- Implementation Plan Template (see page XX in STEM Materials and Toolkit)

**Action Items**

| Facilitator | Leadership Team | Community at-large | Action Item |
|:---:|:---:|:---:|---|
| ✓ | ✓ | | Host business planning session to introduce template and support STEM Leadership Team in the development of strategic plan |
| ✓ | ✓ | | Develop strategic business plan and implementation plan – consider dedicating resources to support a full time employee or contractor in the development of these plans |
| ✓ | ✓ | | If needed, consult a third-party resource (e.g. university partners) for support in structure and development of business plan |
| ✓ | ✓ | | Vet business plan with trusted partners and make necessary revisions |

## Funding Your Plan

**Where Are You Now?**

Developing Your
Business Plan

Launching Your
Innovation

**Funding Your
Plan**
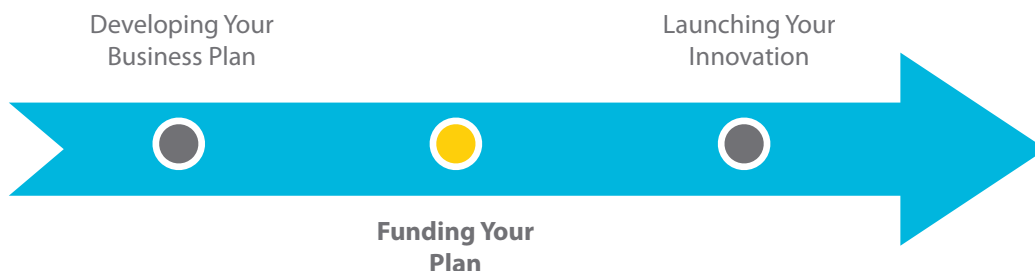
**Goal:** To document strategic steps toward conserving and maximizing resources to ensure the sustainability.

**Overview:** At this point your community has taken major steps to engage leadership, the community at-large and partners in these transformative efforts. Let's face it – there is no future in solely depending on grant money to implement and sustain your innovation. Developing a Resource Plan will impact the sustainability of your innovation by outlining strategic and innovative pathways to fund your efforts. Consider these questions when developing your strategic resource plan – financial strategies allowing you to operate, the benchmark at which your model is self-sustaining, and a clear pathway to profitability. Additionally, consider some of the following investment (direct and in-kind) streams for continued support:

- **Grants:** Seek all local, state and national grant opportunities, especially those targeting STEM
- **Budget Reallocation:** Reallocate existing funds in the local budget to support innovative efforts that may succeed previous programs or initiatives
- **Partnerships:** Creation of partnering agreements that support and sustain day-to-day operational functions of this effort
- **Independent Support:** Create pathways for independent donors to support the local STEM efforts
- **Public/Private Support:** Further engage public/private partners and encourage, especially those in need of a STEM-skilled workforce, to invest financially but also provide in-kind donations such as internships and externships
- **Government:** Seek the support of your local government

**Materials**

- Education Innovation Design Plan (see page XX in STEM Materials and Toolkit)
- Asset Map (see page XX in STEM Materials and Toolkit)

**Action Items**

| Facilitator | Leadership Team | Community at-large | Action Item |
|---|---|---|---|
| ✓ | ✓ | | Host a Resource Planning session to assist STEM Leadership Team in the development of a strategic sustainability plan |
| ✓ | ✓ | | Reference Community Asset Map to ensure  all assets and resources are considered in execution of plan |
| ✓ | ✓ | | Develop and finalize Resource Plan with clear action items and responsible parties |
| ✓ | ✓ | | Implement action items and objectives outlined in Resource Plan with |
| ✓ | ✓ | | Continue to revise plan to meet the current needs of the initiative |

## Launching Your Innovation

**Where Are You Now?**



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Business Plan

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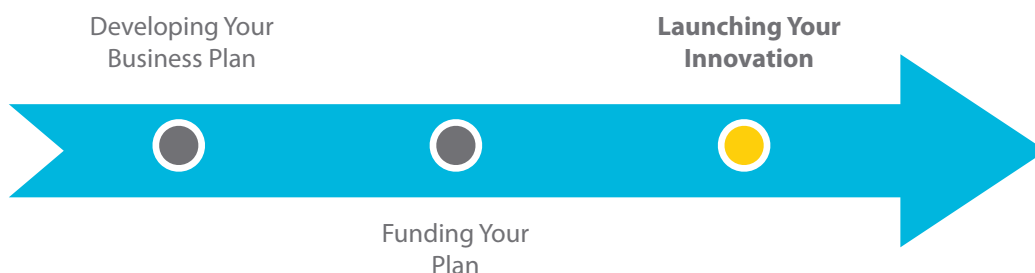
**Goal:** To install and launch your *Equitable, Scalable, Sustainable, STEM-focused, Collaborative* innovation in your community

**Overview:** At this stage you have developed your business and implementation plans to realize the vision and design of your community's innovation. Congratulations, your efforts have paid off and it is time to take action. Now that you have persisted through the arduous planning and development, launching your innovation may seem quite simple in comparison. To launch your innovation, follow your strategic business and implementation plans, hold leadership accountable, and celebrate your successes within your community.

**Materials**

- Business Plan (see page XX in STEM Materials and Toolkit)
- Implementation Plan (see page XX in STEM Materials and Toolkit)

**Action Items**

| Facilitator | Leadership Team | Community at-large | Action Item |
|:---:|:---:|:---:|---|
| ✓ | ✓ | | Host an Implementation Session to familiarize leadership with implementation plan as well as clarify roles and responsibilities of leadership in this process |
| ✓ | ✓ | ✓ | Create awareness in the community regarding the implementation of the innovation – connect previous community engagements with the work |
| ✓ | ✓ | | Continue to follow the implementation plan with fidelity and make revisions as necessary |

## In Practice: Business Planning and Implementation

"STEM Infusion" - Davie County, N.C.

#### Model

STEM Infusion is an innovative approach to professional development that appoints 16 Master Teachers (defined as teachers who have graduated from the Mebane Masters program through a partnership with Appalachian State University) to serve as mentors to beginning and/or student teachers. The infusion model utilizes existing 21st century classroom technology to deliver rigorous STEM curricula directly impacting student interest and engagement in the classroom. As a result of this, Davie STEM aspires to:

- Increase the number of students from all populations that successfully complete higher level STEM courses and pursuing post-secondary STEM careers

- Improve STEM instruction and learning while boosting the academic achievements of all students

- Instill passion for 21st Century STEM teaching and learning in our teachers and students

- Build a network of community/partner collaboration and support which will serve to ensure project sustainability

#### Measurement

To effectively evaluate and quantify the success of STEM Infusion, the following data will be tracked and analyzed:

- Percentage of students in challenging STEM courses

- Achievement levels of students taking STEM courses

- Percentage of students engaged in programs of study that qualify for a STEM diploma

- Assessments of all 5th and 8th grade science and math students

- Ongoing assessments of financial, organizational, and community commitment to post-grant sustainability.

To deepen understanding of success drivers, the following data also will be captured and analyzed:

- Student achievement data, demographics, participation rates, and teacher/student surveys of perceptions of learning outcomes and intent to take other pipeline courses specific to students in classes in the STEM course/opportunity continuum which are 6-8 advanced math/ pre-algebra/ algebra I sequence, 6-8 sequence of robotics courses, honors earth science in grade 8, grade 9 honors biology and geometry courses.

- Pre-and post-assessments of academic achievement, interest and enthusiasm for STEM learning of students who participate in bridge summer courses between grades 5 and 6 and grades 8 and 9.

- Assessments of the STEM Infusion professional development delivery model as measured by numbers of students and teachers served, hours of STEM professional development received by each teacher, pre-and post-intervention teacher/student surveys, number of CEU's awarded to participating teachers, quantity and quality of STEM lesson plans generated by interventions and used by other teachers, and principal perceptions of interventions in relation to teacher evaluations. In order to further understand and attempt to quantify the impact that STEM professional development has on STEM-related student scores, DCS will utilize a Matching Pairs statistical experiment, comparing identified pre-and post-metrics. In addition, Regression Analysis may be utilized to infer causal relationships between the individual metrics and the dependent variable, in this case, teacher professional development.

- Assessments of frequency, quality, and financial support generated from collaborative events with business/industry, stakeholders, and other community partners as well as the quantity and quality of community STEM expert inclusion into our learning environments.

## Sustainability

To ensure post-grant sustainability of the STEM Infusion project, Davie STEM will secure buy-in from business and industry. The following strategies will be implemented to improve the sustainability of the model:

- Davie County Schools will re-distribute existing Title I and II funds to help cover the cost of STEM Infusion Model. (Examples include Title I: Improving Academic Achievement of the Disadvantaged, Disadvantaged Student Supplemental Fund and Low Wealth and Small County Funds)

- Davie County Schools to redirect existing funds for professional development materials and central office professional development administrative positions towards the STEM Infusion model

- Publish best practice materials in an open source format and offer materials for purchase to NC LEAs considering STEM Infusion

- Adoption of a "fee-for-service" program, whereby newly-designed curriculum and delivery kits could be purchased by other school systems.

- Davie County Schools may utilize student housing for summer professional development programs

- Request that a small portion of North Carolina Education Lottery funds be redistributed to support STEM Infusion/Professional Development.

## "STEM Hub" - Lenoir County

## Model

STEM East in Lenoir County has developed a concept for a novel regional STEM Hub. The primary purpose of the Lenoir County STEM Hub will be to provide a foundational platform of collaboration between different local parties affiliated with STEM (and the related topics of general economic development and youth advancement and education), permitting positive impact on the STEM readiness of Lenoir County Public Schools graduates and on the size of the pool of qualified future employees for local industry. Once a platform of STEM-related regional collaboration in Lenoir County is launched and proven effective ("STEM Hub Phase I"), the county will have a solid base for deploying STEM-focused "applications" to address specific, targeted needs in the Lenoir County population ("STEM Hub Phase II"). In particular, two specific applications of the STEM Hub platform have been proposed as a "Curriculum-Development Process" and an "Educational Enhancement" initiative; the content of these Hub applications will be detailed later in this document.

The first application, a "Curriculum-Development Process," relates less to the traditional development of one specific curriculum track and more to the development of a systematic process to identify a STEM-related, project-learning opportunity (needs or project ideas can be identified either at the education level or at the business level),solicit Hub input through a series of pre-defined interface points, develop a curriculum module (or potentially employ a third-party curriculum module) that integrates with the existing academic progression and with North Carolina education standards, pilot the new curriculum module, and quantitatively benchmark results against a control group. The hope is that with the effective Hub network established in Phase I, curriculum modules can provide new and exciting real-world applications of core science and math topics that are needed by the rising local workforce.

## Measurement

Quantifiable annual targets throughout the STEM Hub implementation support the long-term measures of success identified above (see the Theory of Change section). Regular collection and transparent reporting of progress against success metrics is seen as a key means of ensuring funder trust and long-term STEM Hub organizational sustainability. Results relative to targets will be documented in an Annual Review document distributed to partners and posted on the STEM Hub website.

## Sustainability

In order to make the Hub sustainable, funds will be raised via grants, community associations, individual and corporate giving, and governmental support.

- *Grants*: With selectivity, the Hub will seek funding through the grants that are available for STEM-related initiatives. The NC STEM organization has pledged its support in helping the STEM Hub to seek funding from relevant grant-making bodies in the U.S.

- *Community-Association Giving*: Community associations, such as the Committee of 100, have supported the STEM Hub to date. Such community associations will be encouraged to continue their support, and others will be encouraged to join this in this effort.

- *Individual Giving*: The STEM Hub will seek generous donations from wealthy individuals in Lenoir County who believe in the mission of the Hub. A key role of the Board of Directors is to link these potential donors with the work of the Hub via their personal and professional networks.

- *Corporate Giving*: Businesses that require a STEM-skilled workforce will be engaged in many ways such as internships and externships and other in-kind donations.

- *Government*: The support of the local government in Lenoir County will be solicited for support.

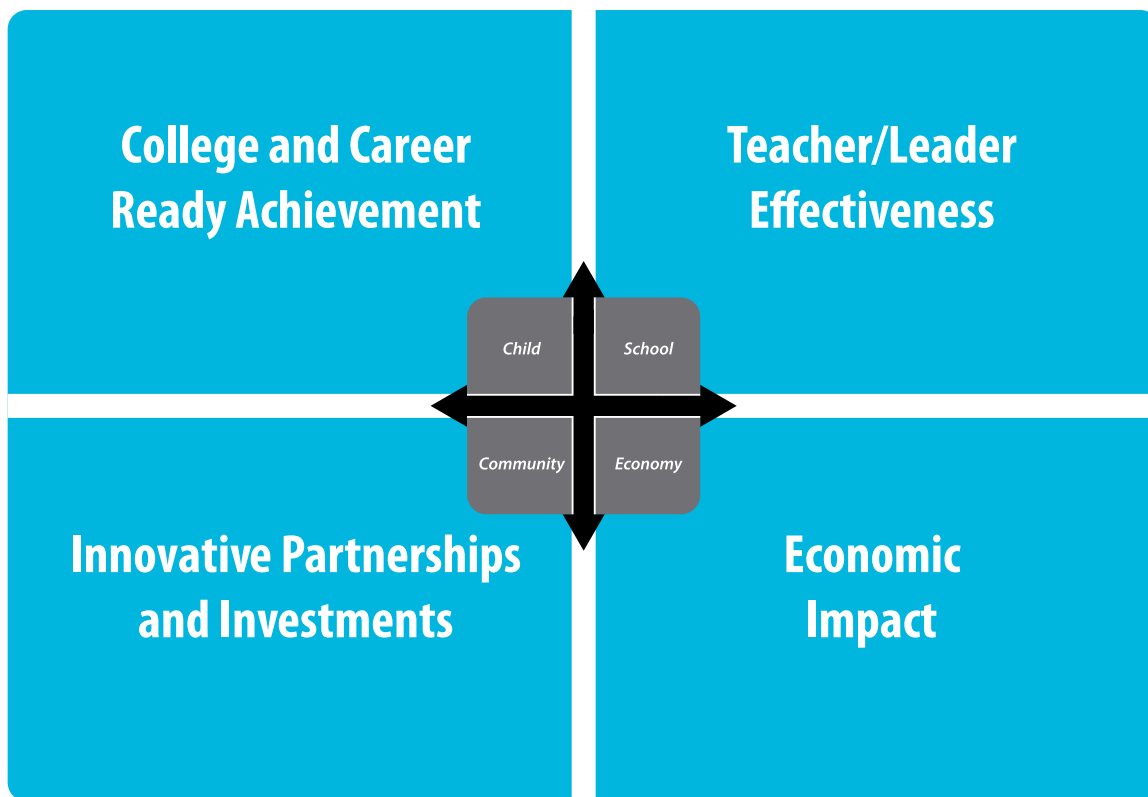## Measuring Success: Collaborative Scorecard

In business, the saying goes, "What gets measured, gets done." In education the saying is, "What gets tested, gets taught." Measurement is critical for all ongoing initiatives.

NC STEM, in consultation with many state and national STEM experts, has designed a tool that defines common STEM education improvement measurements that align with critical areas of North Carolina's statewide STEM strategy. The primary function of the Collaborative Scorecard is to move STEM education and economic innovation further and faster by providing clear success metrics that focus on:

- College and Career Ready Student Achievement for <u>ALL</u> students
- Teacher & Leader Effectiveness
- Innovative Partnerships and Investments
- Economic Impact

You can use this tool in your STEM Community to continuously evaluate, innovate, and ensure efficacy by measuring the impact of your work – on the local, state, and national levels. Consider developing measurements of local impact that are unique to your community as well as work with local, regional, and state agencies to collect and communicate your efforts, results, and ongoing innovations.

- **Local Measures of Impact:** Defined by STEM Community in alignment with the *5 Design Principles* and connected network of partners and communities. Should include measures of the community engagement as well as particular measures of the STEM Community's area of innovation.
- **State Measures of Impact:** Defined in alignment with North Carolina measures of economic, education, and community engagement in coordination with state government and industry partners. Work with state organizations to identify a few, vital core STEM goals/measures for the efforts of the network of STEM stakeholders and STEM Communities to align, extend, and fuel statewide impact.
- **National Measures of Impact:** Defined in alignment with measures of economic, education, and community engagement from the federal government, foundations, corporations, and international organizations. Identify a few, vital core measures for alignment of the efforts of the network of STEM stakeholders and STEM Communities to align, extend, and fuel national impact.

**NC STEM**

## College and Career Ready Achievement

## Teacher/Leader Effectiveness

Child | School

Community | Economy

## Innovative Partnerships and Investments

## Economic Impact

---

**College and Career Ready Student Achievement**
- % Students graduating from high school within 5 years of entering 9th grade; 4 years
- % Students passing (level III)/excelling (IV) in both reading, math, science EOG/EOC tests
- % Students taking Algebra I or equivalent prior to grade 9
- % Graduates passing Integrated Mathematics BC or Algebra II
- % Graduates scoring 3 or above on one or more AP/IB Exams
- Average SAT/ACT composite (of % graduates taking)
- % Students completing a capstone course in CTE, Arts, Second Languages, ROTC
- % Students obtaining an industry certification credential in high school
- Proportion of graduates who enroll in postsecondary programs
- Proportion of first year college students enrolled in at least one remedial course (University, Community College)
- % Students failing at least one high school course in grade 9
- % Students in grades 6 and 9 completing a summer bridge program

**Teacher Effectiveness**
- % Teachers proficient or better on Teacher Evaluation Process Standard IV (facilitate learning for students)
- % Teachers adding at least 1 year of value (per EVAAS value-added module)
- Proportion of full-time STEM teachers certified in STEM discipline(s)
- % STEM teaching positions filled at beginning of school year
- % STEM teacher retention rate
- Proportion of Highly qualified STEM teachers placed in high –need classrooms/schools
- % of teachers employed through alternative licensure/staffing models

Child | School

Community | Economy

**Innovative Partnerships and Investments**
- % Students obtaining a University/Community College credential
- % Students in grades 6 and 9 completing informal STEM enrichment experience (camp, field study, workshop, job shadowing, etc.)
- % High school students completing an internship with a local business/organization
- % Teachers completing STEM related field experience (e.g., externship, field study, camp, study visit)
- # of cross-sector partner alliances (e.g. MOU)
- Amount of partner investments (e.g., financial and in-kind) in STEM education
- Amount of reallocated funds to STEM education
- # of STEM assets utilized/shared with STEM network
- Adoption of Common Core Standards

**STEM Economic Impact**
- # 2 Year degrees and credentials with labor market value in STEM-related fields
- # 4 Year degrees and credentials with labor market value in STEM-related fields
- # of job expansions within existing STEM-related industries
- # of new STEM-related jobs
- % reduction of the supply-demand gap for workforce in STEM-related fields
- % decrease in average hire time for STEM-related jobs
- % increase in average STEM-related salary

# References

Atkinson, Robert and Scott Andes. The 2008 State New Economy Index: Benchmarking Economic Transformation in the States. Rep. Information Technology and Innovation Foundation, 2008. Print

Christensen, Clayton, Heiner Baumaan, and Thomas Sadtler. "Disruptive Innovation for Social Change." *Harvard Business Review* 1 Dec. 2006. Web.

Christensen, Clayton M., Michael B. Horn, and Curtis W. Johnson. *Disrupting Class: How Disruptive Innovation Will Change the Way the World Learns*. New York: McGraw-Hill, 2008. Print.

*Community Asset Mapping: A Critical Strategy for Service*. Bonner Curriculum. Web. <http://www.bonner.org/resources/modules/modules_pdf/BonCurCommAssetMap.pdf>.

Dede, Chris, and Saul Rockman. "Lessons Learned from Studying How Innovations Can Achieve Scale." *Threshold Magazine* 2007: 4-10. Web.

DeVol, Ross and Anita Charuworn. State Technology and Science Index: Enduring Lessons for the Intangible Economy. Milken Institute, 2008. Web. <http://www.milkeninstitute.org/tech/tech.taf?state=NC>

Fitzpatrick, Erika. *Innovation America:  A Final Report*. National Governor's Association. Washington, DC., September 2007. Print.

*Illuminate. Asset Mapping Road Map: A Guide to Assessing Regional Development Resources*. Rep. Council on Competitiveness, 2007. Print.

*Maier, Mark W. and Eberhardt Rechtin. The Art of Systems Architecting, second edition. CRC Press, Boca Raton, Florida, 2000*

*North Carolina Center for Public Policy Research. Changes Needed for Community Colleges to Address Shortages of Nurses, Teachers, and Biotech Workers, Says Center. May 29, 2008.*

Pascale, Richard, Jerry Sternin, and Monique Sternin. *The Power of Positive Deviance: How Unlikely Innovators Solve the World's Toughest Problems*. Boston, MA: Harvard Business, 2010. Print.

Salls, Manda. "It's Back to Business - Basics for Non Profits." *Harvard Business School Working Knowledge* (23 Feb. 2004). Web.

Stephenson, Karen. "The Community Solution." *Strategy + Business*. Booz & Company Inc., 28 Feb. 2008. Web.

Stephenson, Karen. *The Quantum Theory of Trust: Power, Networks and the Secret Life of Organisations*. Harlow, England: FT Prentice Hall, 2006. Print.

Warren, Mark R. "Communities and Schools: A New View of Urban Education Reform." *Harvard Educational Review* 75.2 (2005). Print.

# ACKNOWLEDGEMENTS

# APPENDIX

## Glossary of Terms

**Areas of Innovation**
Target areas NC STEM has designated to maximize the impact of education innovation within the network of STEM communities.

**Business Model**
Document describing the organizational structure of the collaborative, both human and financial. Also includes the critical success factors and essential resources of the prototype.

**Charrette Process**
Problem-solving protocol in which a team concentrates on specific design problems and presents solutions.

**Collaborative Scorecard**
Table displaying indicators and measures of success at the local, state and national levels. Possible metrics include percentage of STEM educators, retention rates and percentage first generation entering college.

**Community Asset Mapping**
The process of identifying the unique resources – human, financial and otherwise – within a community.

**Community Kick-off**
Public event hosted by the Design Team to introduce the Community Visioning Process and partners while allowing the community members to give feedback and learn more about the initiative.

**Competitive Landscape**
Full scope of circumstances that have the ability to impact progress of the project.

**Design Principles**
Five principles that maximize innovation while providing clarity on the goals of student-centered teaching and learning. These principles are Equitable, Sustainable and Scalable, Innovative, STEM-Focused and Collaborative.

**Design Statement**
Description of specific academic and economic needs in the community and the proposed innovation that will address these needs while aligning with the five design principles.

**Design Team**
Collaborative panel of cross sector community members and innovation thought partners who lead the development of a community-supported education innovation plan for the county.

**Education Innovation Design Plan**
Declaration of the innovative design structure a community will use as it pertains to the area of innovation, prototype and collaborative networks.

**Embedded Staff**
Personnel deeply involved in delivery of target expertise and STEM content from outside a community.

**Letter of Agreement**  Record of a collaborative commitment to developing innovation that will engage the community's students in rigorous STEM education.

**Memorandum of Understanding**  Legal document designed to clarify goals and objectives of local partners as well as document monetary and in-kind investments of the NC STEM and community partners.

**Positive Deviance**  Discovery and optimization of existing solutions or strategies within the community or organization to affect behavior and social change.

**Prototype**  The methodology formed to address a specific need in the community that is identified as urgent and critical.

**Ready to Launch Communities**  Communities that have created an Education Innovation Design Plan (EIDP) in the NC STEM proprietary Community Vision and Design Process and are working towards implementation.

**STEM Community Engagement Process**  Targeted course of action to guide communities through their prototype development and education innovation design plan.

**STEM Pipeline**  Process by which students are educated, prepared and enter STEM careers.

**Theory of Change**  Comprehensive analysis of prototype to clarify assumptions and strategies in addition to projecting short and long term impacts.

**Thought Partner**  Individual with particular expertise who adds value to a project, especially but not exclusively the CVP.

**Vision Statement**  Descriptive statement that captures the aspirations of the community as it pertains to STEM education and economic development, a framework by which the innovation is focused and designed.