Empowering Teachers Beyond the Classroom

Tracy Friday
Director of the SEED School
Botanical Research Institute of Texas

Environmental STEM Boot Camp

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Partnerships

"If you want to go fast, go alone.
If you want to go far, go together."

-African Proverb

BRIT
BOTANICAL RESEARCH
INSTITUTE OF TEXAS
Plant to planet.

An E-STEM Platform

Environmental STEM

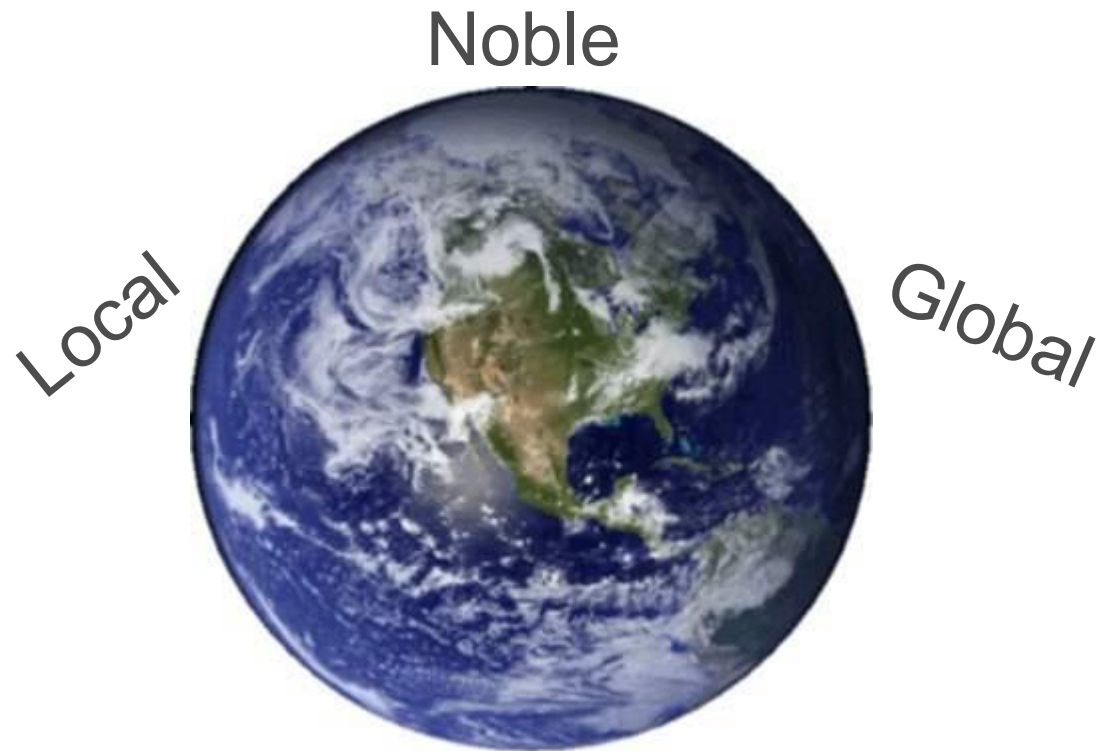Not a Curriculum, but a Mindset!

![GROW - Botanical Research Institute of Texas, Fort Worth Botanic Garden](logo)

Growing the Connections

Noble

Local

Global

3-year cycle of ongoing professional development
Grades K -12

E STEM Boot Camp for Educators

Goal To empower teachers to create PBL opportunities designed with an E-STEM focus that connects students to their environment and encourages them to find solutions for a better tomorrow.

Outcome Students take ownership of the project design and create solutions that help solve environmental issues at the campus, community or global level.

Challenging

Provide learners with a safe environment that allows them to leave their "Comfort Zone" to explore new learning possibilities.

Collaborative

Providing learners with the opportunity to work together to share thoughts/ideas in creating an engaging learning experience.

Reflective

Providing reflection time for learners will assist them in connecting to the learning experience.

Keeping the Objective in Mind

To support educators in the design of engaging Project-Based Learning opportunities that offer authentic learning experiences and expand their professional growth by creating a strong Professional Learning Network.
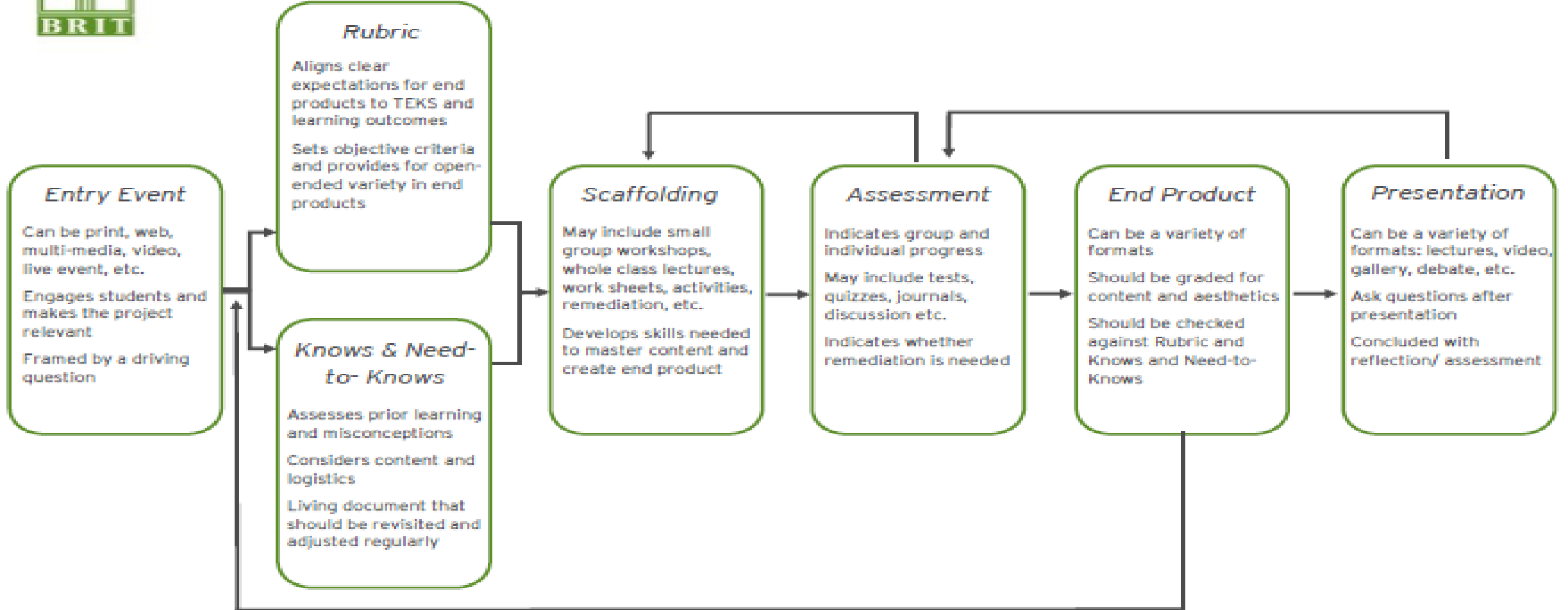
21st century Themes

- Global Awareness
- Environmental Literacy
- Economic Literacy
- Health Literacy

Project-Based Learning Critical Attributes

A Flow to Successful PBL

Rubric

Aligns clear expectations for end products to TEKS and learning outcomes

Sets objective criteria and provides for open-ended variety in end products

Entry Event

Can be print, web, multi-media, video, live event, etc.

Engages students and makes the project relevant

Framed by a driving question

Knows & Need-to- Knows

Assesses prior learning and misconceptions

Considers content and logistics

Living document that should be revisited and adjusted regularly

Scaffolding

May include small group workshops, whole class lectures, work sheets, activities, remediation, etc.

Develops skills needed to master content and create end product

Assessment

Indicates group and individual progress

May include tests, quizzes, journals, discussion etc.

Indicates whether remediation is needed

End Product

Can be a variety of formats

Should be graded for content and aesthetics

Should be checked against Rubric and Knows and Need-to-Knows

Presentation

Can be a variety of formats: lectures, video, gallery, debate, etc.

Ask questions after presentation

Concluded with reflection/ assessment

Share Project Ideas with Critical Friends Sentence Starters:

I like...

I wonder how...

A good next step would be to...

Design Collaborations that All Group Members Contribute to:

Have groups create contracts

Help group members hold each other accountable and give feedback

Change group member's roles

Things to Remember:

Trust the process

Aspire for authentic projects that extend beyond the school

Keep the end in mind throughout the project

Be a facilitator, not a "sage on the stage"

BRIT

GROW Program Design Rubric

| Criteria	Does Not Meet the Criteria 0 pts.	Somewhat Meets the Criteria 2 pts.	Meets the Criteria 4 pts.
Addresses plant or environment content	Program does not address information on plant science or environmental issues/concepts.	Program addresses some plant science and environmental concepts, but not clearly.	Program has a clear connection to Plant science/environmental concepts.
STEM Initiatives	Program does not address an STEM initiatives.	Program addresses some of the STEM initiatives.	Program addresses ALL STEM initiatives.
Inquiry-based	Program does not address Inquiry-based learning strategies.	Program addresses some inquiry-based strategies.	Program is a true inquiry-based experience.
Literacy Component	Program does not contain literacy components.	Program addresses some literacy components.	Program is focused on literacy.
4 C's Creativity Communication Collaboration Critical Thinking	Program does not address the 4'C's in the learning experience.	Program addresses some of the 4'C's in the learning experience.	Program addresses the 4'C's in the learning experience.
TEKS or Community Connections	Program does not address the TEKS in it's design.	Program addresses 1 or 2 of the TEKS in it's design.	Program addresses the TEKS of multiple disciplines.
Career Connections	Program does not address career connections.	Program addresses career connections, but not clearly to the learning experience.	Program address career connections clearly to the learning experience.
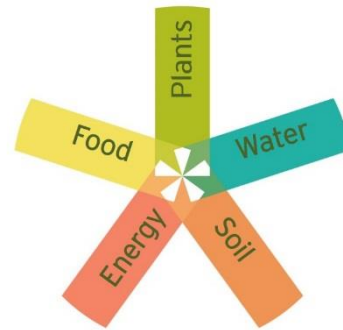
Boot Camp I - Local

Collaboration
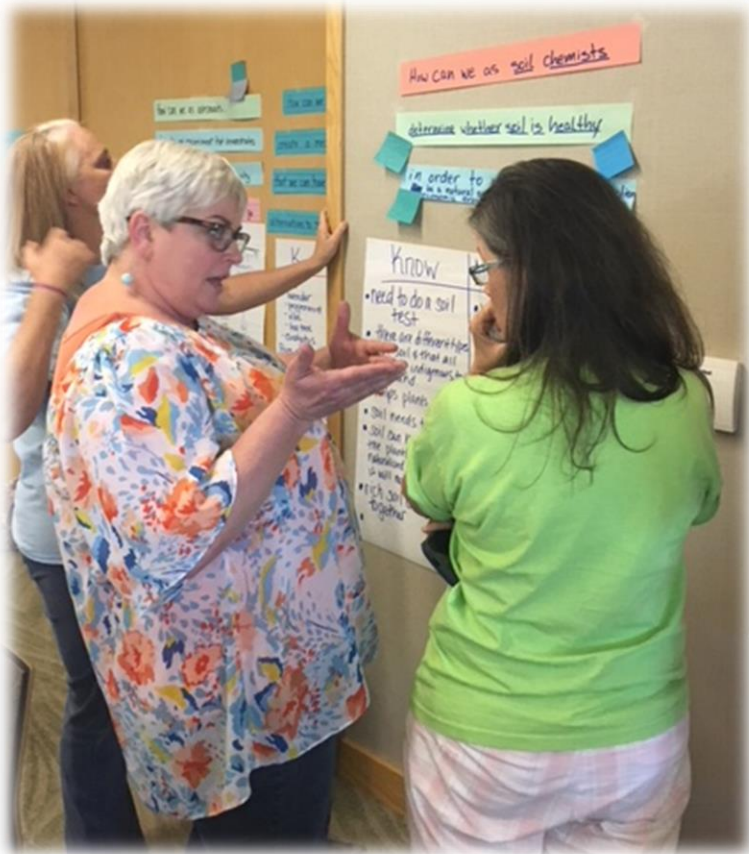
Exploration

Creating the PBL Platform
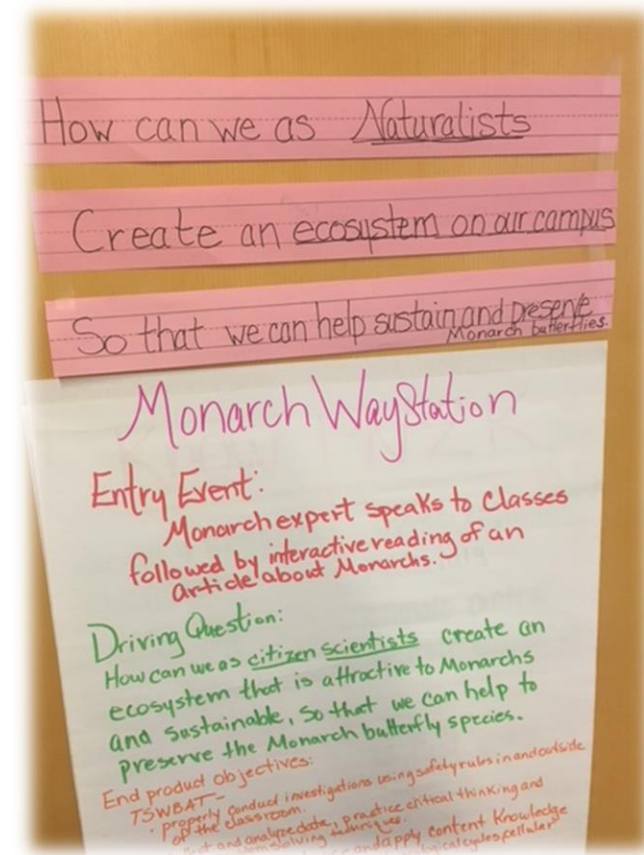
Boot Camp II -The Noble Impact

Boot Camp III – Global Impact

Student – Centered Learning

Student – Centered Learning

Student Quotes

Learning Practical Project Skills

S.F. – Heard Museum Rainwater Catchment System
"The most important thing is to do a lot of research on the project ideas up front…it is important to try to reach out and talk to as many experts as possible. Once we met with Dr. Jaber, we had to entirely change our plans, but it taught us a lot. Without his guidance and insights our project would have turned out entirely differently."

Student Quotes

Experiencing Nature & The Community More Deeply

B.F. – Bird Houses on PSHS Campus
"The most unexpected lesson I learned was how tranquil and peaceful bird watching could be, also how highly populated they are around the school."

T.H. – Invasive Plant Species Removal in Oak Point Park
"I was most thrown off by the volume of plant species that were in fact invasive at Oak Point. Having visited the exact site that we worked at previously, everything seemed to be in tune from the outside looking in. However, it was proposed to us to remove plants along the trails, the same plants that I was under the impression were supposed to be there."

Community Partner Quotes

Heard Museum Volunteer Coordinator
RE: Heard Museum Rainwater Catchment System

"I enjoyed working with students who were really interested in the project and excited about visiting the Heard. S*** was very focused and brought great engineering skills to the design. He call me several times and adjusted based on what I needed vs. something on the web. N*** spent time explaining the AP class to me and I enjoyed hearing what they were learning since I'm also interested in the environment. I was very happy with the end result. This was a large project and I'm impressed they were able to complete it."

Assessment

Boot Camp Assessment Tools →
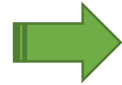
- Exit Tickets
- Surveys
- Teacher interviews
- Interactive Portal

Need to Knows

Best Practices

What are your Knows and Need to Knows for Project-Based Learning?