

CHAPTER FOUR

NON-TECH STEAM EDUCATION MODELS

There are various methods to teach STEAM education, including both high-tech and low-tech approaches. While high-tech activities are common, low-tech or no-tech activities can also effectively teach STEAM, particularly relevant for schools with limited resources or in rural areas.

STEAM education extends beyond robotics kits and coding; it emphasizes developing 21st-century soft skills through activities that don't necessarily require expensive equipment.

In this training, the focus is on using readily available materials to create engaging STEM activities.

Educators are encouraged to explore their environment to design context-based and creative activities, fostering local relevance and creativity.



NON-TECH MODELS

1. PLACED BASED STEAM EDUCATION
2. PROBLEM BASED LEARNING
3. PROJECT BASED LEARNING
4. TINKERING - REVERSED ENGINEERING
5. INQUIRY BASED TEACHING AND LEARNING

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PLACE-BASED STEAM EDUCATION

Place-Based STEAM Education is an innovative approach that capitalizes on the unique characteristics and resources of a specific geographic location to enrich learning in the fields of Science, Technology, Engineering, Arts, and Mathematics (STEAM).

It recognizes that the environment, culture, and community of a particular place offer valuable opportunities for hands-on, contextually relevant education. By integrating local ecosystems, heritage, and challenges into the curriculum.

Place-based STEAM Education not only makes learning more engaging but also empowers students to become active participants in their communities and stewards of their environments.

This approach cultivates a deep sense of connection between learners and their surroundings, fostering a holistic understanding of STEAM concepts that extends beyond the classroom, ultimately equipping students with the skills and knowledge to address real-world issues in their backyards and beyond.



PLACED BASED STEAM EDUCATION

In essence, place-based learning revolves around understanding the relationship between the learning content and the local environment. It incorporates students' lived experiences and interactions with their surroundings into the learning process.

This approach can encompass problem-based learning, experiential learning, outdoor education, cultural awareness, and more. It engages students within their community, emphasizing their physical surroundings, culture, history, and people.

By involving students in their community's development and interactions, it enhances communication, inquiry skills, and their self-awareness in the global context.



GOALS

- Impact communities
- Improve student and teacher engagement
- Boost student's academic performance

BENEFITS

- Learning is grounded in local communities and contexts.
- The learning experience is student-centered and personalized.
- Learning is relevant and engaging. Students can be challenged to see the world through ecological, political, economic and social lenses.
- Students can have more agency and autonomy — boosting motivation and persistence.
- Social-emotional learning can be a priority.
- Instruction can be interdisciplinary.
- Lessons can be inquiry-based
- Students can meet deeper learning outcomes.
- Students can gain better appreciation and understanding of the world around them.
- Design-thinking can be encouraged

PBL DESIGN PRINCIPLES



LOCAL TO GLOBAL

"LOCAL TO GLOBAL" EMPHASIZES STARTING THE EXPLORATION OF PLACE FROM SELF-AWARENESS AND EXPANDING OUTWARD TO LARGER CONTEXTS.

LEARNER-CENTERED

"LEARNER-CENTERED" IT EMPOWERS STUDENTS TO ADDRESS COMMUNITY ISSUES AND PROPOSE SOLUTIONS.



INQUIRY BASED

"INQUIRY-BASED" GROUNDED IN OBSERVATION, RELEVANT QUESTIONING, PREDICTION, AND DATA COLLECTION TO COMPREHEND THE ECONOMIC, ECOLOGICAL, AND SOCIO-POLITICAL WORLD.



DESIGN THINKING

Design Thinking" offers a structured approach for students to impact communities through the curriculum, fostering meaningful change.

COMMUNITY AS CLASSROOM

Community as Classroom" treats communities as learning environments, integrating local expertise, experiences, and places into the educational process.

INTERDISCIPLINARY APPROACH

Interdisciplinary Approach" aligns with the real world, integrating traditional subject content, skills, and attitudes through project-based, interdisciplinary teaching.

Placed Based Activities

EXAMPLES



**INTERNSHIP WITH LOCAL
BUSINESSES OR INSTITUTION**



FIELD TRIPS



COMMUNITY SERVICES

WHAT CAN WE DO:

Community Asset Mapping

Asset mapping is a comprehensive method for identifying and documenting essential services, resources, and strengths within a community. This includes individual skills, organizational assets, physical spaces, institutions, associations, and local economic elements. It acknowledges that both individuals and communities possess valuable contributions that can aid local schools in their educational endeavors.



FIVE STEPS APPROACH IN ASSET MAPPING

- **Mapping Community Assets:** The initial step is to identify and document the available assets within the community, involving individuals, associations, businesses, and institutions that support STEAM education. This step aims to understand the existing STEAM resources in the community.
- **Building Internal Relationships:** The process fosters relationships among local assets, encouraging collaboration for problem-solving within the community. Diverse groups collaborate to engage in practical activities, potentially forming partnerships among teachers, schools, and parents to advance STEAM learning.





- **Asset Mobilization:** Asset mapping promotes the mobilization of community resources to support students' development. This involves identifying and utilizing local resources to create relevant learning content. For instance, partnerships with local businesses might provide opportunities for students to gain real-world experience through job shadowing or internships.
- **Building a Vision:** Asset mapping helps in designing a sustainable class learning vision by incorporating community assets. This ensures community support and commitment to students' educational growth.
- **Establishing External Connections:** Asset mapping not only involves insiders but also considers external stakeholders who align with the STEAM goals. This approach allows for broader engagement and partnerships to enhance students' learning experiences.

GROUP ACTIVITY

STEAM COMMUNITY ASSET MAPPING

Use your community Map
Identify as many STEM opportunities
and organizations in your community
from your asset map.



ASSET FEATURES

- Relationships
- Skills
- Institutions/Organisations

Questions

Using your community map, participants are to identify patterns on the map and can use the questions below as a guide.

1 What do you notice?

2 What do you wonder?

3 Where are our strengths?

4 Where are there fewer opportunities?

5 Where are the opportunities located?

6 Where do the learners typically underserved in STEAM live and go to school? Is there a relationship?

Questions

Using the same map as a guide, identify patterns on the map and can use the questions below as a guide.

- 1 What is the history of how these developed?

- 2 What connections, if any, exist between these various entities?

Create a table that organizes the assets identified on your map into a list with space to include contact information and notes about each asset.

Choose some of the opportunities on the asset map and discuss the nature of each opportunity and how learners would engage with each.



*Science is simply the word we
use to describe a method of
organising our curiosity*

TIM MINCHIN