

Webinar on
metaStudio.org
www.chatShala.in
Conversations on
STEM Projects

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Outline

- metaStudio: a platform for STEM Education
- A free and open source software platform for education
- Engagement through investigative and innovative projects
- Why STEM?
- Why Games?
- Why Projects?
- Why and how to cultivate STEM Habits?
- Recognition through badges
- How to participate in metaStudio?
- Q/A



Welcome to Gnowledge Lab!

Design and Development of Collaborative STEM Engagements!

STEM Habits

Nurturing and Recognizing STEM habits, bringing Culture to the Foreground of Education

An R&D laboratory of [HBCSE \(Homi Bhabha Centre for Science Education\)](#), [TIFR \(Tata Institute of Fundamental Research\)](#), Mumbai, India. The lab's focus is on *designing and developing discourse based collaborative constructionist learning environments AKA studios*. We also develop, design and distribute information and communication technology for studio based STEM education and share our research and developed material to the rest of the world under Creative Commons license.

17866 e-Resources | 17252 registered

NROER

The screenshot displays the NROER eLibrary interface. At the top, there are logos for the Ministry of Education, Government of India, and NROER. The navigation bar includes 'Repository' and 'Workspaces' tabs, a search icon, 'Help', a notification bell, 'Language | en', and a 'Login' button. The breadcrumb trail shows 'Home > eLibrary >'. The main content area is titled 'eLibrary Homogeneous collections of resources' and features a search bar with '-- Select --' dropdowns. On the left, a sidebar lists file statistics: Collections (401), All files (14441), Documents (2778), Interactives (1270), Audios (1664), Images (2586), and Videos (6142). A 'File Statistics' button is located at the bottom of the sidebar. The main grid contains five resource cards: 1. 'Tangent and Radius of a Circle' (Geogebra applet) by nroer_team, dated 28/07/2015. 2. 'Qutub Minar Old 24' (Iron Pillar) by nroer_team, dated 08/05/2017. 3. 'सफर कलेक्टर का' (Safar Kallekter Ka) by nroer_team, dated 05/09/2019. 4. 'Indian Economy On the Eve of Independence' by shanum4u, dated 05/09/2019. 5. 'Inflation' by shanum4u, dated 05/09/2019.



CLix

4 states | 1100 schools | 4500 teachers

MetaStudio platform

Activity Topics

STEM Chat

190
2 unread
1 new

Make a brief and quick post on: What STEM activity are you doing today? What is the STEM take-home point of today? What is the STEM activity picture you want to share today? What is the big STEM idea you want to share with us today?

CUBE chat

Projects

31
2 unread

Welcome to the projects section! Here we will periodically publish STEM Research projects (experiments, citizen science projects, data collection, analysis, investigations...) and Build Your Laboratory (tinkering, fabrication, simulation, prototyping, laboratory instruments, electronics, engineering, ...)

Latest

📍 Moina : a model system
CUBE chat 57

Strengths & Challenges of working with model organisms!
Events 3
3h

Why does the Kingfisher bob it's head? •
STEM Chat 2
6h

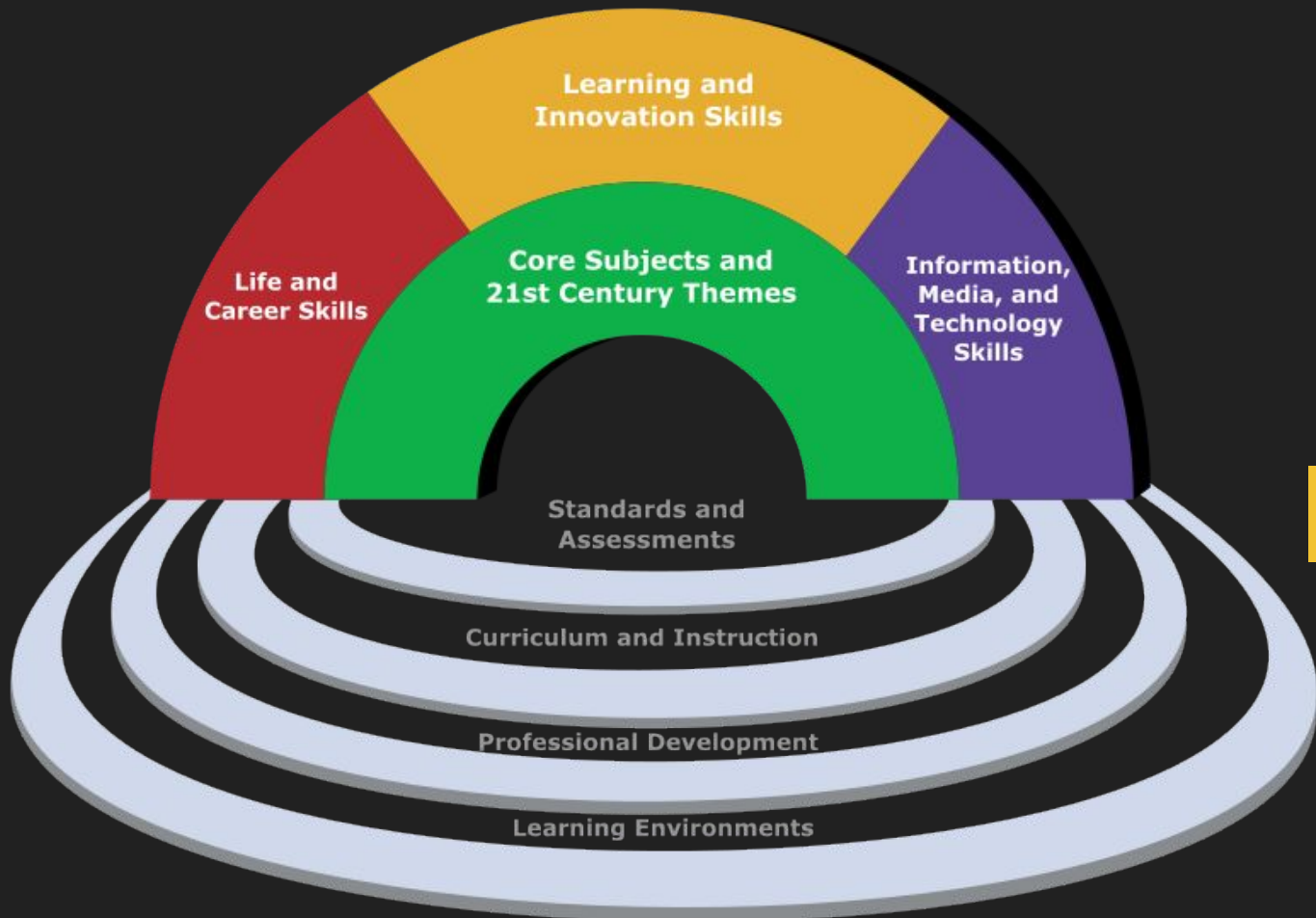
Establishing moina culture in smt.C.H.M.College 2
CUBE chat 69
14h

Can Piezoelectric energy can be stored or commercialise in form of electricity
STEM Chat 2
2h
Other Tags: experimentation

~50+ projects | ~1500 users | ~60+ Badges



Why STEM?



21st century learning goals

Figure 1 - P21 Framework for 21st Century Learning

Why Games?

a lesson from Indian cricket for STEM education



We play them together



We get involved

We need spectators



Everyone knows the rules of the game

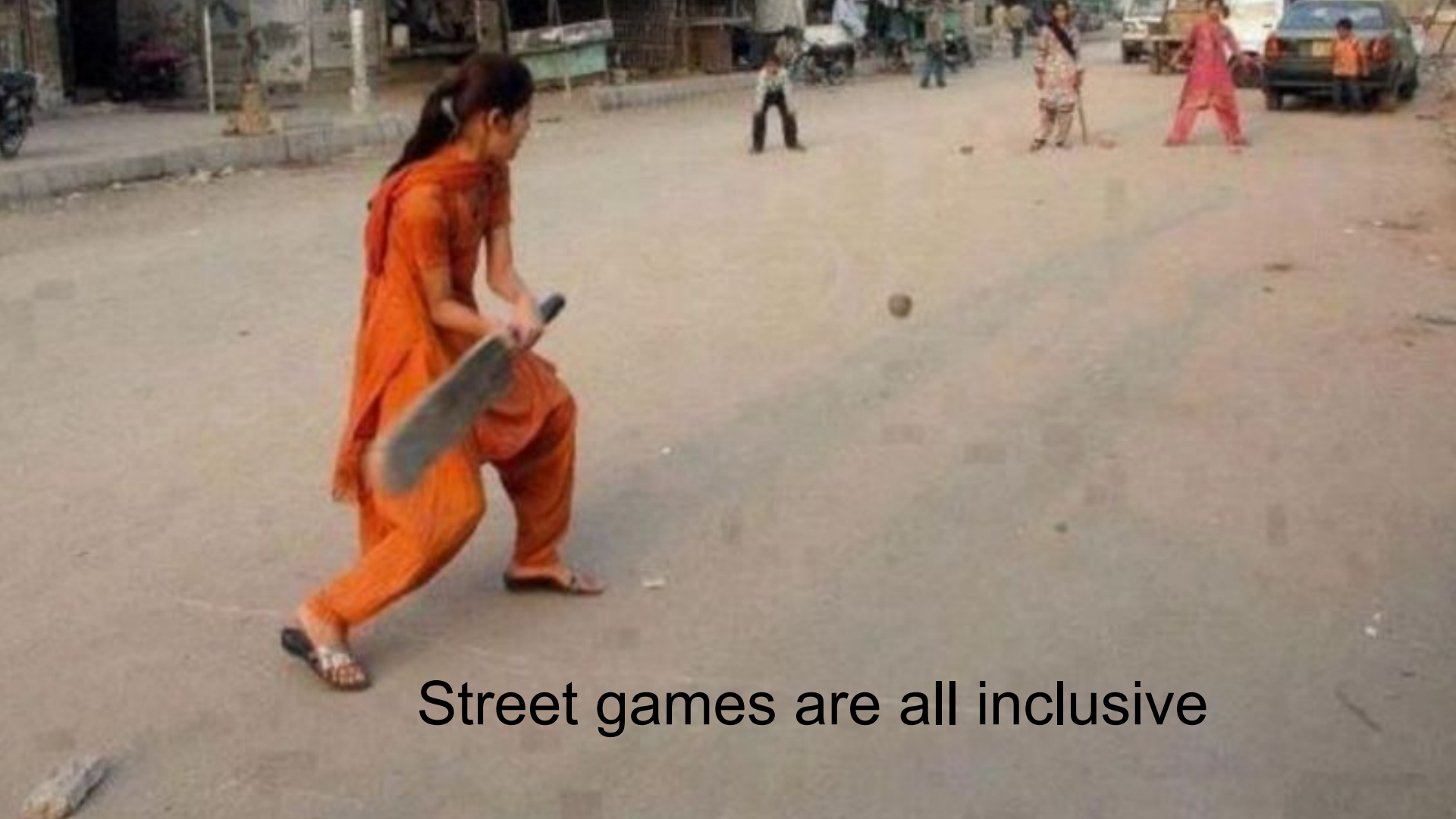


We make our own playground



We innovate when we don't find facilities





Street games are all inclusive



Frugality makes
everyone to join



laughingcolours.com

Innovation and imitation continues

Lets learn from them and make
STEM accessible



Just as we took cricket to the streets,
and became world class,

we need to build STEM clubs in every
corner of the street!

metaStudio is created to support this.

Some Examples

What can we investigate at the election time?

Mapping biodiversity at doorstep

Making as a context

Tinkering, Repairing and

Recycling

Why Projects?

To create clubs, frugal labs and
encourage tinkering / maker spaces
At every school and street corners.



- Creating opportunity for conversation
- Collaborative Investigative projects
- Discourse Driven
- Low barrier to entry
- Contextualization
- Sophistication in mind
- Frugal resources

Spectrophotometer



Micro Weather Station



Innovation Projects

Aeroponics

मिट्टी बिना कैसे जीना यारा ?
Mitti bina kaise Jeena yaara ?



Hard Disk based Centrifuge



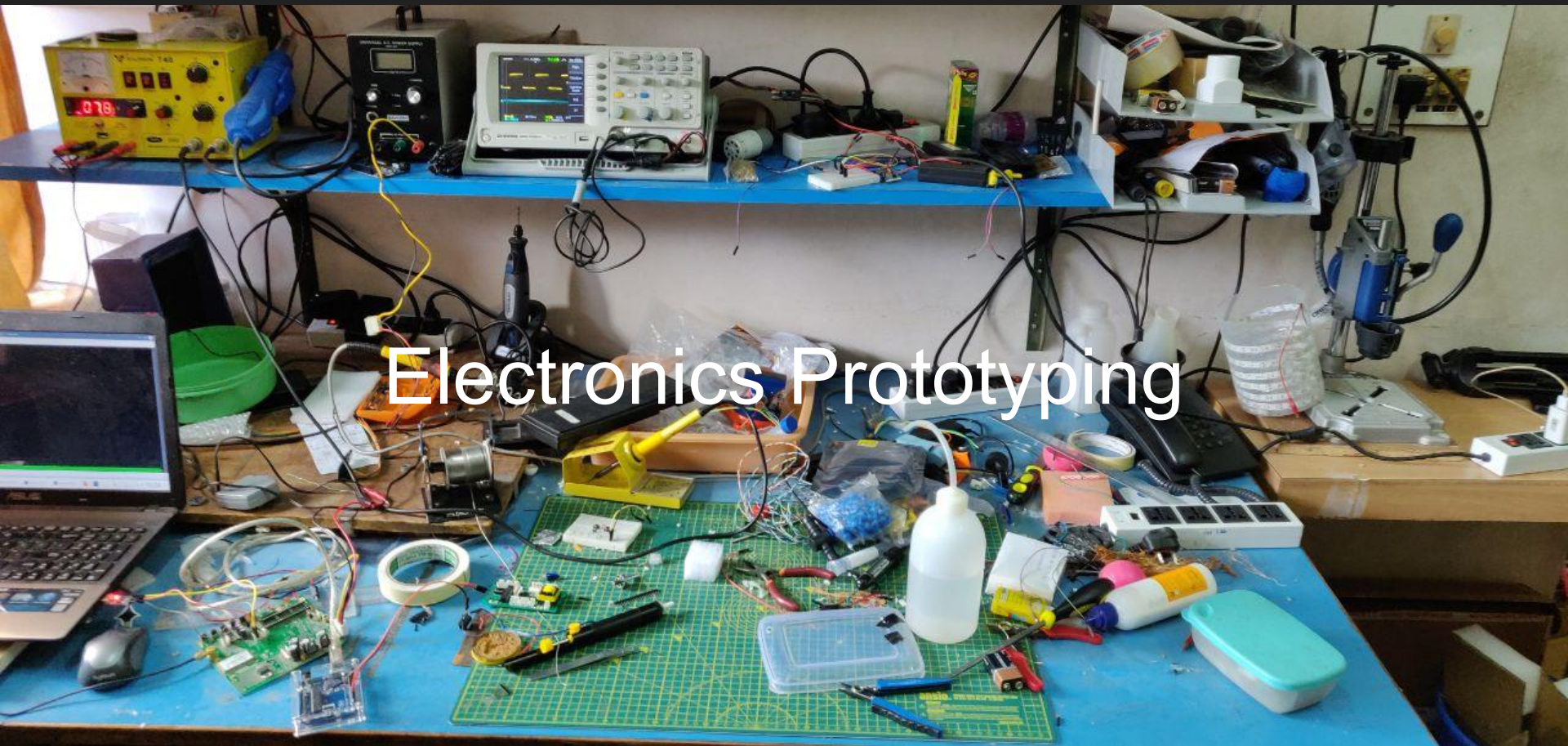


WoodWork Space

CO-OP
STEM GAMES



Electronics Prototyping



Community participation



Investigation Projects



CUBE
ChatShala

Everyday
From
7.30pm to 9.30pm



Example of STEM investigations

Study heredity patterns and construct traps to catch wild populations of *D. melanogaster* (fruit fly)

Gain an understanding of the life cycle of insect exhibiting metamorphosis

Learn to keep concise journal notes

Learn culturing techniques to keep the flies healthy

Realize many science experiments cannot be conducted and concluded within one or two lab session



Example
of model
system

Hydra



Snails



Shot on realme X
By S.J.Uday

Butterfly



Children
working
alongside
mentors to
study the
water flea



2000+ Students
60+ clubs

Mathematical

generalise, spacial thinking, review, axiomatic, mensuration, proportional & statistical thinking, estimation, plotting, simulation

Engineering

experimental, tinkering, parametric-thinking, calibration, investigation, sustainable practice, production, frugality,

Design thinking

fabrication, modular-thinking, standardised interfacing, sensitivity-to-versatility, doodling

STEM Habits

Communication

creating, reporting, citation, note-taking, presenting, narrating, being-specific, engaging, forthcoming, inviting-collaboration

Thinking & Reasoning

enquiry, inquisitive, problem-solving, rigor, speculation, review, verification, mapping, explanation, critique, critical thinking, creativity, reasoning, generalisation

Data & Observation

data-collection, data-visualisation, extrapolation, classification, curation, bug-finding, survey, empirical, cartography

metastudio.org

Why and how to cultivate STEM Habits?

Content does not matter, creating and engaging with content does.



Mathematical

generalise, spatial thinking,
axiomatic, mensuration,
proportional & statistical thinking,
estimation, plotting, simulation



Engineering

experimental, tinkering,
parametric-thinking, calibration,
investigation, sustainable practice,
production, frugality,



Design thinking

fabrication, modular-thinking,
standardised interfacing,
sensitivity-to-versatility, doodling

Data & Observation



data-collection, data-visualisation,
extrapolation, classification,
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empirical, cartography

Thinking & Reasoning



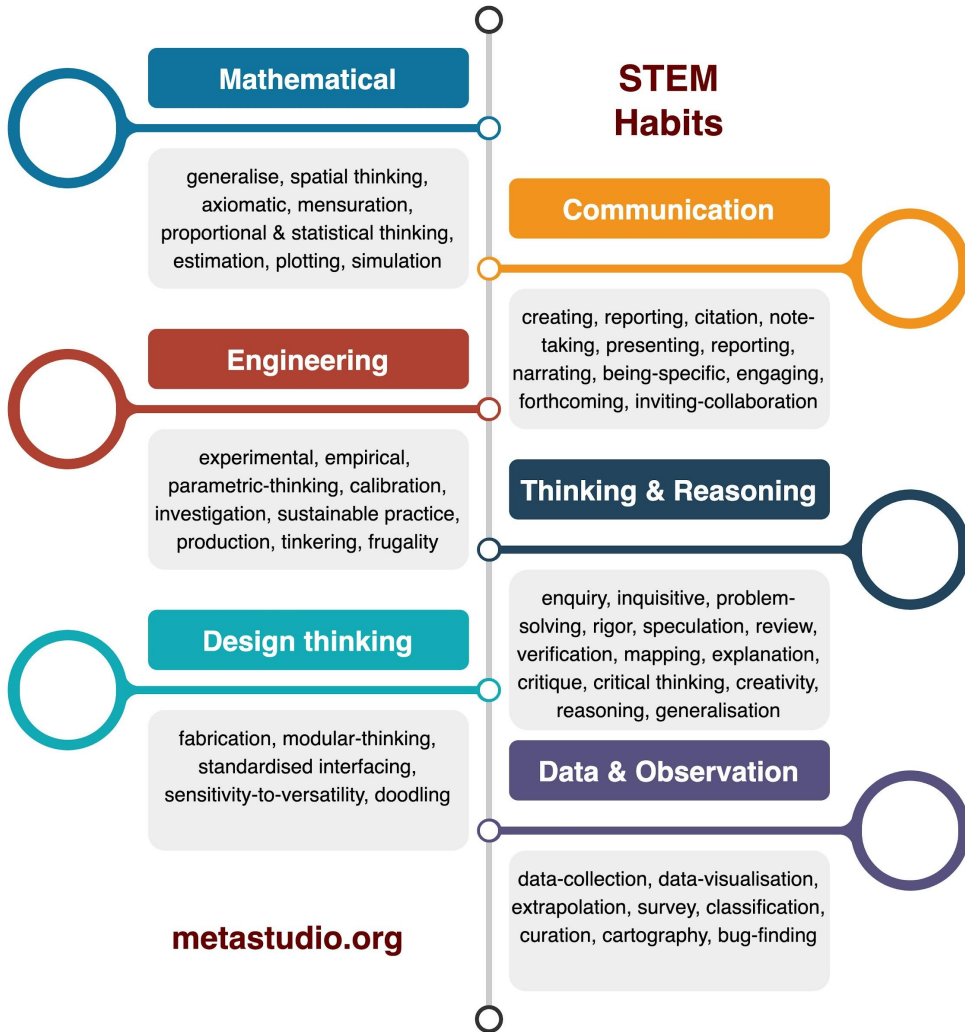
enquiry, inquisitive, problem-solving, rigor, speculation, review, verification, mapping, explanation, critique, critical thinking, creativity, reasoning, generalisation

Communication



creating, reporting, citation, note-taking, presenting, narrating, being-specific, engaging, forthcoming, inviting-collaboration

STEM Habits



Recognition through badges

Reimagining Assessment

STEM Habits



Keen Observer

15

Keen observers see more than what normal people can see in a phenomenon.



Artist

10

This badge will be given to those who represent a phenomenon or an object through a picture.



Author

12

Who writes projects/experimental investigations as STEM Games.



Axiomatic

Who declares assumptions, defines terms, and states a set of postulates to build a model/theory.



Blogger

13

Who narrates and writes blogs (essays) to share the experiences with others about the investigation.



Bug Finder

6

Locates and reports problems.



Calibrator

Adjusts measuring instruments to map to standards.



Cartographer

9

One who maps events and places using geographical coordinates.



Classifier

One who partitions a domain into one or more types of events or things according to a known criterion.



STEM BADGES

Live Demo
of
metaStudio

Thank you

Q / A

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