



Invitation to join

COOL STEM Games

Collaborative Open Online Ongoing Learning through STEM Games that recognize and foster STEM habits through Creative Investigative Projects



Gain credits as badges for each STEM habit



and many more...

Games starting from 15th June, 2019

Who can participate?



Students



Teachers



Teacher Educators



Citizen Scientists



Researchers

How to participate?

You can participate directly through your browser using a mobile or computer: <https://metaStudio.org/>



STEM Games brought to you by Homi Bhabha Centre for Science Education, TIFR

COOL STEMGames



Welcome to COOL STEMGames!

A Collaborative platform for Open Online and Ongoing Learning through STEM (Science, Technology, Engineering, and Mathematics) games. We publish projects periodically, which are specially designed to inculcate STEM habits among participants. A platform developed keeping in mind 21st Century Learning Goals.

Build a STEM Lab if you don't have or make it active and vibrant if you already have one. Make share and seek feedback and help!



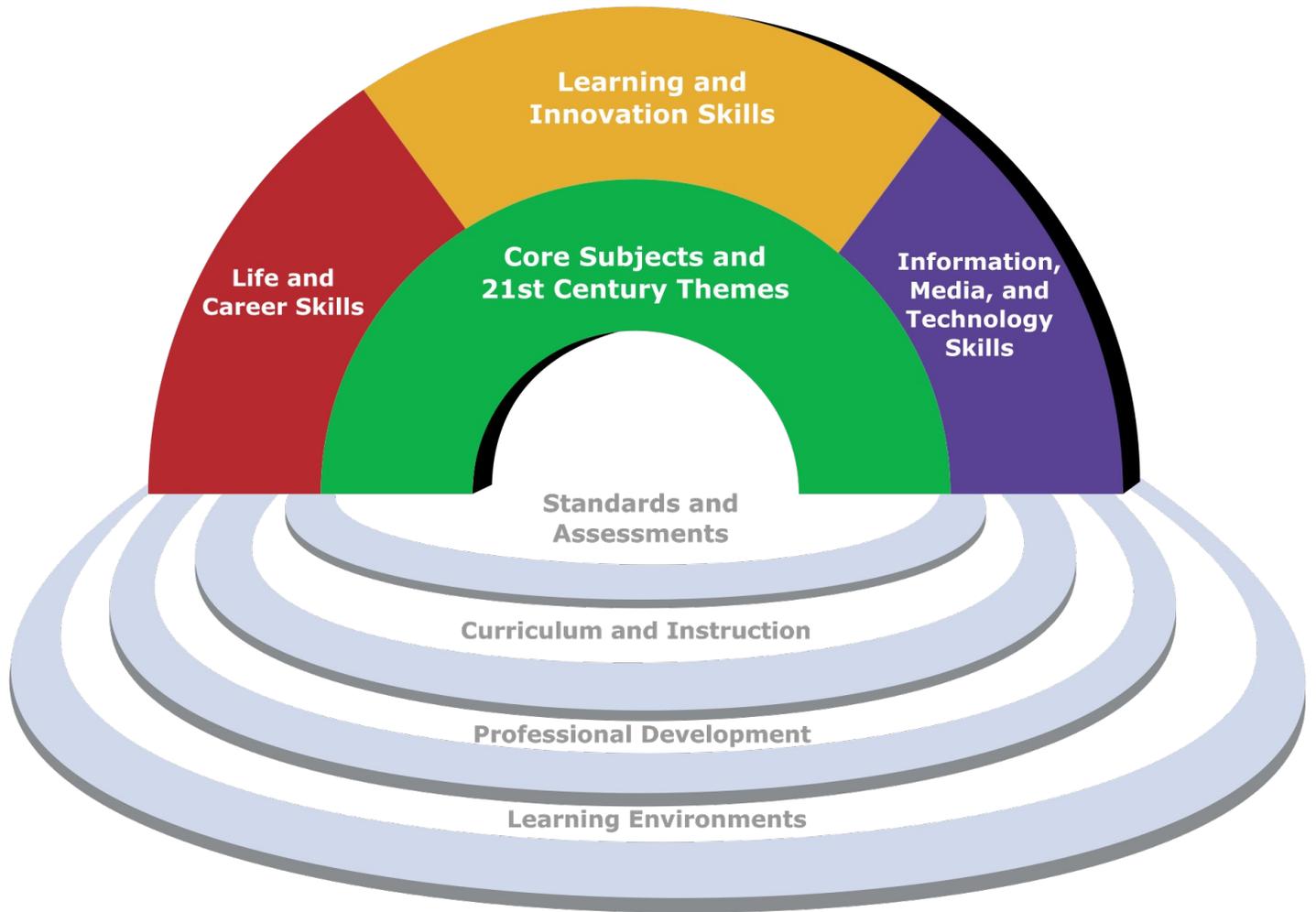


Figure 1 - P21 Framework for 21st Century Learning





What are STEMGames?

STEM Games are gamified STEM project challenges:

- Research challenges (Laboratory or Field)
- Build your own lab project challenges

Most STEM research projects need a lab (unless they are field projects). Many schools and colleges do not have a lab. By participating in the projects, you can create a lab or makerspace if you don't have one, and those of you who already have a lab can make your lab/makerspace more active and vibrant space.

These projects become a context to cultivate and recognize STEM habits.





STEM

The acronym “STEM” is widely expanded to Science Technology Engineering and Mathematics. Often people ask if Art and Design are part of STEM. Is sociology or economics part of STEM?

We make a distinction between content and research practices. All subject areas can be researched using the same STEM practices. STEM is considered here more synonymous with research and development practices, and not identified by content. Interpreted this way, STEMGames are Research and Development (R&D) Games.

Creative use of media and tools is Art. Researchers do use media and tools creatively. We also grant badges for creative use of tools. Creating tools and media is engineering. Design is an integral part of engineering. We grant a collection of badges for design thinking and maker skills. Thus research and development projects as a context for learning and teaching define the scope of STEMgames.





STEM Habits

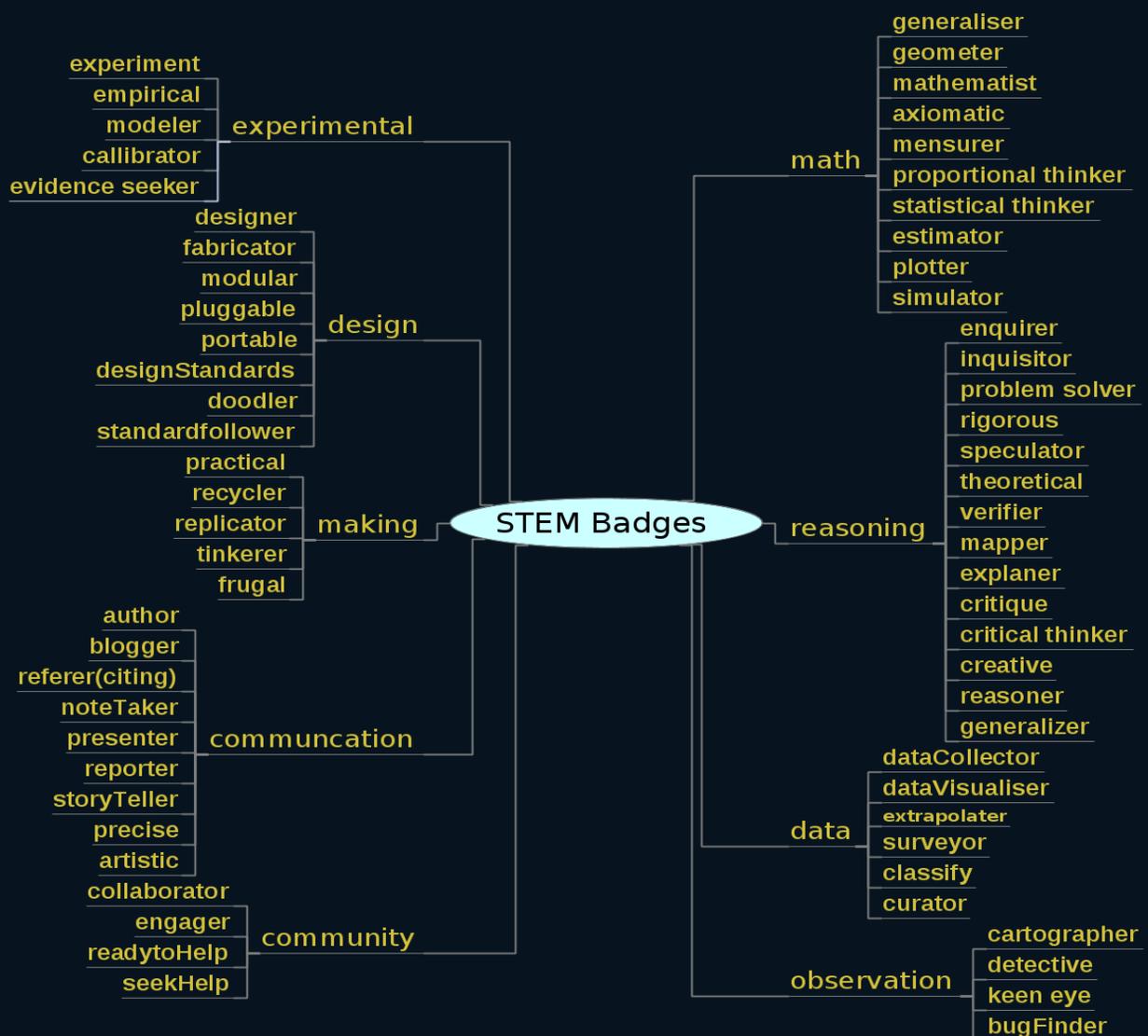
This platform is specially designed and crafted to recognize and cultivate the habits/practices that promote STEM (Science, Technology, Engineering, Mathematics) culture in the society. Each project we publish here will be mapped to specific STEM habits, and those who complete the project will be credited by awarding the specific badges. If you are interested in designing projects, you are invited too! Some of you could become referees of these projects and could grant badges to participants or design projects by becoming Staff (organizers) of this platform.





Why Games?

Games are rule following practices, and the rules are known to the players as well as to the spectators. Academic practices also follow rules. Often the rules are not made explicit in the conventional STEM education. When we make the rules explicit, not only the practitioners but also the spectators can develop an understanding of research and development activities that happen in STEM labs. For wider appreciation and participation of STEM projects we label the practices in the form of habits that can be cultivated as well as recognized.





Badges

We grant two kinds of badges: for COOOL Habits and for STEM Habits. COOOL habits are about how civil, engaging and collaborative we are, while STEM habits are required for becoming proficient STEM practitioners. COOOL badges are granted automatically by the platform, while the STEM Habits are granted by the qualified referees whenever participants display proficiency in any of the mentioned STEM habits. Most of these badges can be granted multiple times to participants. Certificates will be awarded based on cumulative score.

STEM Badges are classified into:

- Mathematical
- Empirical
- Experimental
- Design
- Social
- Communication and
- Thinking and Reasoning

STEMGAMES
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 Fabricator Who puts things together and assembles to make a working product.	 Frugal Always looks for alternatives that are less expensive and easily available.	 Generalize Based on observed trends/pattern makes a general statement about the domain or phenomena.
 Geometer Geometrical description of a phenomenon or an object.	 Inquisitive Curious to know more and strives to achieve deeper levels of understanding.	 Keen Eye An eye for detail.
 Mapper Relates things to one another.	 Mathematician Mathematically approaching a problem or a phenomenon.	 Mensurer One who does care about measuring something.
 Modeler Describing and explaining phenomena through properties and their relationships (variables and parameters).	 Modular Thinker Analyzing a system into relatively independent components.	 Note Taker Maintains a journal and records every small detail on a regular basis.
 Plotter Presenting data in any of the graphical formats.	 Pluggable Designer One who makes components with interfaces to connect other components.	 Portable Designer Making a product versatile and adaptable to different situations.
 Practical Who is down-to-earth.	 Precise To the point.	 Presenter Makes effective communication.



Pedagogical Framework

The project is inspired by constructionist, and connectionist models of education.

- The best context for learning is written, verbal and expressive conversation in a constructive playful environment.
- The context for conversation is a research and development project.
- Bring cultural practices, such as STEM habits, into the foreground, while keeping the content in the background.
- Learning happens through assimilation and accommodation of a knowledge in the form of a network of actions performed by socially networked agents.
- Knowledge is generated and propagated through recurring action patterns (action schemas), called habits.
- A collaborative, friendly, safe and negotiable learning environment is required for inclusive education.
- A learning environment to be kept as close-to-life and as close-to-professional practices as possible.
- Learning to be made visible to and experienced by the learner.





A Safe, Civilized, Collaborative Platform

The platform is carefully designed and crafted for civilized discussion of research and development projects supporting:

- Conversing with each other and in groups
- Recognition of habits through conversational interaction by granting badges supported by state-of-the-art badging engine
- Curating projects and resources
- Collaborative editing of documents (Wiki)
- Control mechanisms for stopping fake and indecent communications
- Customizable notifications, email alerts and summaries
- Multilingual content
- Accessible through mobile as well as desktop computers

STEMGAMES Sign Up Log In Search Menu

STEM Chat 44 / month
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?

Projects 5 / month
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, design and develop laboratory instruments, electronics, engineering, pro...

Events 23 / month
Once in a while, we will have activities that have a set time. The activities have to be done at the specified duration or at that time. Watch out for such events, else you may miss the opportunity. We will remind you through posts at the STEM Chat section.

Home 2 / month
We will publish topics which are about this project, why are we doing, who can join, how to join, and some guidelines for participating.

Navigation Menu:
Latest Top
Badges Users
Groups Tags
Categories
STEM Chat 49 Events 24
Projects 18 Help & Feedback 17
Wiki 9 Home 7
Blogs 7 NMS Jaipur 2
RVCE STEM Ac... 1 Podar 0
About FAQ
Mobile View

Recycling e-waste STEM Chat
Students of Social Telangana launch STEM Chat
How fast do new STEM Chat
Building a Digital Microscope using a Webcam NMS Jaipur
Aeroponics - Can we grow plants without soil? NMS Jaipur
Aeroponics - Can plants grow without soil and milliliters of water? Projects
Cooling plant roots when sunlight hits balcony STEM Chat



Who can participate in the STEM games?

Students, teachers, teacher educators, researchers, citizen scientists, homeschooling parents/students or in fact, any curious mind. This means it is open to all.

If you are a teacher:

The best mode of participation for teachers is to gather a group of students and send @referees of this platform a message to create a group for you. In case you want to invite other teachers or other students from the platform, please invite them to your group. Since STEM games are collaborative, group formation is recommended. Keep encouraging the students to gain badges and cultivate STEM habits, and in the process use this opportunity to see how we recognize STEM habits.

If you are a student:

Please try to form into a group and invite a teacher/mentor who is known to you to guide/mentor while you do the projects. If you cannot find a teacher due to some reason (after you gave a serious try) please elect one of the students as a mentor. We are always there to mentor through online dialogue. Group membership need not be rigid, you may invite others whom you get to know at this platform as well.

If you run a STEM Lab and you are a researcher:

Please write a note in “STEM Chat” about the work your lab does, the problem you are investigating, and opportunities of participation by others (particularly students and teachers) in your project. When you and your group of investigators join STEMGames, we can create a group for you where you can discuss your research on a regular basis, even if it is among your group.

If you have Tinkering Lab

We offer several challenging and innovative projects for those who like to design, fabricate or just enjoy making innovative computing, robotic, IoT and electronic instruments/devices. We offer special training through workshops if you want to setup a lab at your place.



If you are a STEM education researcher:

You can investigate whether STEM habits are actually getting cultivated, whether STEM habits enhance conceptual understanding, examine the pedagogical and design principles of the games/projects, critique any of the processes happening here, provide feedback on the effectiveness of the activities, provide help to @referees and the participants. If you wish to join as a referee, design a project keeping the author guidelines in view and send your proposal to @referees.

If you are a Citizen Scientist:

This is a great place to be in, because we provide citizen science profile to most projects to encourage participation from any interested citizen, and not limited to formal educational institutions. You are free to become part of a project/activity based on your interest. If you want to form a STEM club or you already have a club in your locality, we strongly encourage you to send us a request to form a group preferably by your club name.

If you are a Home Schooling Parent:

If your child has an email, this could be your children's safest online academy. Please select a project that is suitable for your children, and encourage them to learn by participating in a project. Create a community of other such parents and children and encourage your children to learn through investigative projects. This community could mentor your children to develop STEM habits among others.

If you are a STEM Activist:

You may have already got a community as well as projects. We can recognize your community members, by recognizing the STEM habits that you are cultivating among citizens. You can also host your projects at this platform. We would also be happy to encourage our members to take part in your activities, to promote your STEM project. Write blogs about your projects and stories from the field to inspire the visitors here, and tell members how they can join your projects.

If you are an administrator:

By administrator, we mean principals/head of the departments/dean/director of schools or colleges. Please encourage your teachers and students to participate in the STEM games. Provide them a space to form a STEM club in the campus. Send us a message to our @referees, who can conduct an orientation session at your place. We can try our best to travel to your place if possible, otherwise, we can always schedule a webinar (online meeting) with your teachers/students/staff. The projects at this site are a great opportunity to make your labs active. If you do not have facilities, we can provide ideas on how they can be sourced or fabricated. The tinkering projects at the site help you to build a lab from scratch at a minimal expense but enhanced learning. If you have an Atal Tinkering Lab in your school/college, we have great project ideas.



Access Through Mobile App

<https://play.google.com/store/apps/details?id=com.stemgames>

Access Through Internet Browser

<https://metaStudio.org>

Follow us Through Twitter

<https://twitter.com/COOLSTEMGames>

Write to us:

Email: stemGames@gnnowledge.org

We invite academic and implementation partnerships with private or public organizations, schools, colleges, universities and Govt departments.

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Free and Open Source Software

The Platform and Mobile App Source code is available from <https://github.com/gnowledge/>

Credit:

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