STEAM ICAC

CURRICULUM

DISCLAIMER

All aspects of the curriculum are optional. Chapters may choose to drop aspects of the curriculum or add material. The curriculum has a tentative timeline of 11 weeks. Resources not directly provided in this document may also be used

TIMELINE

Week 1: Learning to plan, and write scientific reports

Week 2: Event-specifc lessons

Week 3: Discuss global sustainability issues

Week 4: Recent Technological advancements and uses

Week 5: Engineering (Infustructure, automation, urban planning)

Week 6: Art (Graphic design, elements of design in STEM fields)

Week 7: Science (Experiments and demonstrations)

Week 8: Math (Problem solving and hands-on activities

Week 9-12: Rehearsing for STEAM ICAC

SCIENTIFIC REPORT & PRESENTATION

Scientific Presentation

Discuss the structure, format, and the process of making a scientific presentation. Explain the important aspects that must be included and give presentation advice.

Includes:

- Title
- Introduction
- Objectives
- Methods
- Results
- Analysis
- Conclusion
- Sources

Scientific Report

Explain the structure and appropriate format for the writing of a scientific report, discussing what is to be included and how the bibliography must be formatted.

Includes:

- Title
- Introduction
- Abstract
- Procedure
- Results
- Analysis
- Conclusion
- Sources

ENGINEERING EVENT

As the demands of society evolve and urban population increase over time, traditional public transportation is less sufficient.your team will design a modular public transportation system that is capable of meeting **a set of requirements** which can be found below.

Materials

Drawing/planning tools, digital option available, any medium of presentation

Activity

Design a public transportation system that meets a set of requirements

Design Requirements

- **Minimises the usage of land to as great an extent as possible.**
- **Adaptable to influxes of passengers and those with special needs.**
- **Environmentally Concious, durable, long-lasting, easy to maintain.**
- **Adaptable to different urban locations locally and globally.**
- **Safe and reliable during inclement weather, routine maintenance, etc.**
- **Low construction cost and minimal usage fees for passengers.**

LIFE SCIENCES EVENT

Over 43 million people around the world are blind, with a further 300 million suffering moderate to serve vision impairment with current assistive technologies being lacklustre. In this activity, your team will design a wearable navigation system which creates a 3D “map” through use of sound for these individuals.

Materials

Drawing/planning tools, digital option available, any medium of presentation, all other resources required to create a physical or digital model of the final product (up to participant discretion).

Activity Instructions

Discuss and research the day-to-day challenges faced by individuals with varying degrees of vision lost, in addition to the current assistive tehcnologies available and how they function.

Design a device that uses sound to help users detect and navigate through their surroundings. Creating a functioning, physical prototype of the design is highly encouraged.

Create a 5-7 minute presentation with your group on your project. Include a detailed description of how your device functions in addition to all other relevant technical information.

ASTRONOMY EVENT

As humanity takes to the stars, finding life-sustaining planets is a priority. Existing detection methods have a tendency to miss smaller, habitable planets. You will create a way in which smaller, habitable planets can be consistently detected and classified based on habitability.

Materials

Drawing/planning tools, digital option available, any medium of presentation, all other resources required to create a physical or digital model of the final product (up to participant discretion).

Activity Instructions

Research and discuss current detection and classification systems, their existing issues, current and potential future technologies, in addition to possible workarounds to current problems, etc.

Propose an alternate detection method and create criteria to rank suitable planets for colonization. Design a detection and classification system based on the selected method and criteria.

Create a 5-7 minute presentation with your group on your project. Include a detailed description of how your system functions in addition to all other relevant technical information.

COMPUTER SCIENCE EVENT

With the advent of novel home surveillance technologies, millions of hours of footage is recorded daily, most of which is never viewed, This contributes to wasting electricity, storage. and energy. Your group will pitch a design for a more sustainable but equally functional system of home surveillance.

Materials

Drawing/planning tools, digital option mandated, any medium of presentation, all other resources required to create a physical or digital model of the final product (up to participant discretion).

Activity Instructions

Research and develop an understanding of the basis upon which existing technologies function, human perceptual science, and compression technologies

Design a surveillance system that is able to effectively compress extraneous data, in addition to a system that is able to effectively filter this data.

Create a 5-7 minute presentation with your group on your project. Include a detailed description of how your system functions in addition to all other relevant technical information.

COMPUTER SCIENCE ACTIVITIES

Option 1

Learn about different coding concepts using Scratch or Python, depending on the experience level of the student and the amount of instruction available.

INSTRUCTIONS

Introduce students to coding concepts using Scratch or Python. Students can create simple animations games, other software, etc.

Option 2

Research characteristics of software design, such as efficiency and power. Create a game to apply these principles in a hands-on, creative way.

INSTRUCTIONS

Students can use GDevelop, an opensource game development platform, to design their own games. This can be a multiple-seisson activity.

ENGINEERING ACTIVITIES

Option 1

Learn about building stability constructing the tallest, most stable structure possible within a time limit. Structures will be tested for stability.

INSTRUCTIONS

In groups, students will use materials such as straws, Popsicle sticks etc to their structure. They will discuss design choices, challenges, and strategies for improvement.

Option 2

Research and discuss elements of the manufacturing industry. Include the aspects engineers consider when designing a piece of machinery for a specific task

INSTRUCTIONS

In groups, create a blueprint for an existing piece of machinery in any STEM field.

ART ACTIVITIES

Option 1

Learn about the importance of integrating art with STEM fields and explore how creativity can be expressed while developing STEM knowledge.

INSTRUCTIONS

Create an architectural layout of a room, with a goal of designing an aesthetically pleasing and functional space. The completed drawings will be judged.

Option 2

Learn the basics of graphic design and understand its applications. Practice creating a visually appealing and effective design using the principles studied.

INSTRUCTIONS

Create a poster with information about any prompt of their choosing. Participants are encouraged to apply learned principles and creative thinking.

SCIENCE AND MATHEMATICS

Science

Slime breaks most of the laws by Sir Isaac Newton. Formulate a question, write a hypothesis, and conduct the slime experiment. Note observations, gather/analyze data, and write a conclusion.

INSTRUCTIONS

In small groups,follow the instructions provided on worksheets and create slime, noting observations that defy physics and discuss those observations

Mathematics

Explore practical applications of mathematical concepts through hands-on activities and competitive challenges.

INSTRUCTIONS

Build the tallest and most stable structure possible with marshmallows and toothpicks, using their knowledge of geometry. Structures are judged based on height, stability, and creativity.

MOCK PRESENTATIONS

To prepare participants for STEAM ICAC, chapters are encouraged to hold mock-presentations. Presentations should be timed and feedback should be given based on the ICAC criteria, found below.

Tips

- Encourage particiapants to develop presentation skills (ie. eye contact), in addition to other technical knowledge
- Ideally, participants should be prepared to present well before ICAC (1-2 weeks) to give time to make adjustments and address feedback from mock-presentations.

STEAM ICAC Criteria

https://steaminnovationchallenge.org/wp-content/uploads/2025/08/STEAM-ICAC-2026-Prompts-Criteria-1.pdf