

Step Into STEM

Overview

Step Into STEM is offered to middle school students at the sixth-grade level as a STEM elective class. The year-long class allows students to explore the 4 STEM Pathways of Engineering, Computer Science and Computational Thinking, Biomedical Sciences, and Digital Design/ Emergent Media. Students use STEM as a focusing lens while they engage in project-based and problem-based challenges. Students enjoy in-depth problem-solving as they research and create solutions to local challenges in each unit, then share what they learn with other community and business stakeholders, mastering 21st century life skills along the way. Special emphasis is placed on teamwork, collaboration, communication, creativity, and developing the skills needed to be successful in a STEM field in the future. As part of the course, students will meet the following objectives:

Objectives

- Expand awareness of various careers and occupational pathways related to the STEM Pathways
- Develop an understanding of higher order thinking processes such as the engineering design process, the scientific method, and computational thinking.
- To develop foundational knowledge and skills in STEM
- To increase interest in the four core areas of STEM related to this class through project-based activities that are also standards based.
- Identify career opportunities in various STEM fields.
- Use computing technology for creative expression.

Assessment Students will be assessed using projects throughout the class, exams, and daily/ weekly assignments.

Course Outline

Module 1: Introduction to Engineering	Intro to Engineering, Engineering Design Process, PBL, STEM, Safety, Tool Usage, Build a Pinball Machine, Design a Holiday Table/ Window Display, Settings, Backdrops, Visual Elements, Color, Scale, Movement, Electromagnets, Lights, Sound, Micro:bits, Sensors, Programming, Build a Device to resolve flooding problems
Module 2: Biomedical Sciences	Scientific Method, Redesigning a School Living Space, Soil Properties and Plant/ Soil Interactions, Nutrition and deficiencies, Local plant and animal needs, How to Prevent Athlete Sudden Death in PE/ Sports, Dehydration, Osmosis, Diffusion, Genetics, Ultrasounds, Designing Solutions to Heat and Cold Exposure in Our Community, States of Matter, Energy Transfer, Heat and Cold Stress,
Module 3: Digital Design and Emergent Media	Intro to Digital Design and Emergent Media, Build a Career Poster for a Louisiana College or Technical School, Elements of Art, Principles of Design, Feldman's Critical Assessment, Digital Storytelling- Create an Audio-story on a Community Figure", Audio Production, Sounds, Recording, Sound Waves, Modeling Waves, Create Sound Effects, Story Development, Interviewing Techniques, Storyboards, Create a Silent Story for a Local Cause, Visual Story-telling, Video Recording and Tagging, Cinematography, Writing Scripts, Creating Video Shots, Props, Editing
Module 4: Computer Science and Computational Thinking	Intro to Computing, Use various computer languages and platforms to create 2D and 3D games, apps and/or interactive simulations and visual experiences in order to understand basic programming techniques and computational thinking. Students will create a game around the community and/ or a cause in the community using computing as the medium.



Gordon A. Cain Center

STEP INTO STEM

1. Materials

Internet access, one-to-one computer use daily, and access to the LSU servers.

Reusable Hardware/Material	Recommended Unit	Cost/Unit
Various reusable material and hardware for projects	1 per classroom	\$1,500
Consumables		
Various consumables for projects	1 per classroom	\$500

*Complete supply list can be found [here](#).

2. Required software, networking access, and access to LSU servers

- Students will need to sign up with online development and testing environments, including but not limited to codesandbox.io, jsfiddle.net, scratch.mit.edu and others.
- Students will need access to YouTube instructional videos relevant to the course, as well as other educational video repositories.
- Teachers will need to be able to access the LSU servers using several Internet protocols including but not limited to HTTPS and SSH.
- Students and teachers will access the curriculum and teaching materials through the LSU servers, and through Google Drive.
- Teachers will need to share student data with their designated LSU Pathway Point-of-Contact.
- Principals will need to communicate with the district's information technology department to ensure that there are no technological restrictions that block access to the LSU servers in the lsu.edu or lsupathways.org domains on any port. In addition to the sites mentioned above, students will need web access to:

https://nutrientsforlife.org/product/humanity-against-hunger/	https://nutrientsforlife.org/product/humanity-against-hunger/	Unity or Scratch	Learn.Genetics (utah.edu)
Edulastic.com	Python editor	audacity	https://manual.audacityteam.org/quick_help.html
Micro Bits software	https://bio.libretexts.org/Bookshelves	https://www.bbc.com/news/health-23358290	https://manual.audacityteam.org/
Youtube	https://todayshomeowner.com/debate-over-organic-chemical-fertilizers/	https://www.theweathernetwork.com/news/articles/five-awful-ways-extreme-heat-affects-the-human-body/51464	https://forum.audacityteam.org/
Google Drive	Zoom or other video conferencing platform	https://pbs.twimg.com/media/B61aGsYlgAAPdSo.jpg	Making Documentary Videos: The Interview - Videomaker
instructables.com	https://www.lakeshorehealthpartners.com/Uploads/Public/Images/Blogs/URGENT%20CARE%20infogra	https://pbs.twimg.com/media/DyHUp2jXcAlopBB.jpg	https://www.mayoclinic.org

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https://hallowlane.com/the-complete-diy-motors-for-halloween-props-guide/	https://www.cdc.gov	https://ehs.princeton.edu	https://sciencing.com
Makecode	https://www.coolantarctica.com/Antarctica%20fact%20file/science/cold-weather-sport.php	WEVideo or other video editing platform	https://designschool.canva.com/courses/canva-101/?lesson=opening-canva-for-the-first-time
Canva for education Canva.com	https://blog.nols.edu/2015/12/18/4-ways-you-can-get-cold-and-how-not-to	https://lpb.pbslearningmedia.org/resource/lps07-sci-phys-thermalenergy/thermal-energy-transfer/	https://www.osha.gov/SLTC/heatstress/controls.html

3. Required teacher collaborations

Teachers will communicate with LSU instructors via emails, apps hosted on the LSU servers, and the band.us app.

4. Required administration of course content, pre/post test, and research instruments

All required materials and instruments will be either posted in the LSU servers or their location announced via email with the teacher/instructor group for this course.

5. Course Work

Teachers must present the course material in sequence or as approved by collaboration with the LSU Pathway Point-of-Contact. In the fall semester, teachers will report post-test results for each unit to the Point-of-Contact. In the spring semester, the teacher is responsible for utilizing the LSU servers based system to release, acknowledge, provide student feedback, and grade student work. The LSU servers will track and notify the teacher as students near the required 75% attainment mark for certification.

6. Other

As this is a project-based learning class, we strongly suggest that each section of the course be limited to a *maximum* of 25 students. The course is dependent on the teacher providing feedback and reviewing student code. The course requires that teachers have adequate time to interact with each student.