Overview of Summer Learning Programs

Summer learning programs (SLPs) are designed to provide students with additional opportunities for learning and growing during the summer months. Systems should strive to create opportunities for all students to access a summer learning program.

Overview of STEM

STEM (Science, Technology, Engineering, and Math) encompasses the knowledge, skills, and ways of investigating and making sense of our world that are essential to each of the STEM disciplines (from National Research Council, 2014):

- **Science** refers to both the body of knowledge that explains our natural world as well as the practices we engage in to build this knowledge.
- **Technology** is any human-designed tool or process that solves a problem.
- **Engineering** is a body of knowledge about the design and creation of technology as well as the process and practices we engage in to solve problems.
- **Mathematics** is the study of patterns and relationships among quantities, numbers, and space, including logical arguments and claims.

Students who engage in quality STEM experiences are better equipped to respond to life's challenges and make informed decisions as empowered members of society. Engineering design offers students an opportunity to develop their problem-solving abilities, which in turn supports the foundations of math problem solving and algebraic processes. Scientific thinking and understanding are useful tools, not just for scientists and other STEM professionals, but for our students as they approach complex challenges in their everyday lives. Quality STEM experiences employ the skills and practices required in all STEM disciplines and share deep connections to core math and science instruction.

Best Practices and Approach

Quality STEM experiences are an essential part of a well rounded education and should be embedded in summer learning programs. STEM should leverage integrated learning across disciplines through student-centered investigation and design experiences that

- are connected to the real world;
- hold relevance to students' daily lives;
- inspire engagement and joy;
- build confidence and belonging; and
- cultivate key competencies necessary to persist and succeed, not only in STEM disciplines, but in life.

This approach to STEM builds student agency, positioning learners as valuable and active participants in the teaching and learning process. The affordances of building interest and supporting positive identity development in STEM reach far beyond increased motivation and engagement. Positive and confident math, science, and STEM identities are linked to increased levels of proficiency, academic achievement, and persistence and success in STEM disciplines and careers.

Summer Planning Support for STEM

Science	Essential science core ideas for each grade level are articulated in the Louisiana Student Standards for Science (LSSS). However, simply having content knowledge is not enough. Students must investigate and apply content knowledge through engagement in practices, or behaviors of scientists and engineers to investigate real-world phenomena and design solutions to problems. High-quality science learning environments that make use of high-quality materials as intended exemplify STEM, as engineering, technology, and math are deliberately and meaningfully interwoven into the standards. For science, SLPs should accelerate science learning by making use of units or lesson sets from the high-quality science curriculum that students were not able to engage with during the prior academic year. In addition, and particularly in cases in which students experienced the full curriculum, SLPs should offer quality STEM programming as outlined in this document. Examples of quality STEM materials with strong science standards alignment are included in the sample materials table below.
Technology	Technology proficiency is best developed through integration within meaningful quality learning experiences. Computer skills should not be taught or drilled in isolation; rather, they should be developed and applied through other core and enrichment activities. Explore LDOE's Digital Learning and Computer Science resources for more information.
Engineering	The **Engineering Design Process*** provides a framework for designing and structuring student experiences in STEM. Students begin by **asking** questions about a problem and **imagining** possible solutions. Then, students move on to **planning** for and **creating** solutions and ultimately iterating and **improving** upon the solutions. It's important to note that this cycle is fluid and students should have the flexibility to flow from one phase of the process to another and back again as needed. *adapted from Museum of Science, Boston
Math	Summer learning programs (SLP) for math should include experiences that promote student agency through the building and exploration of positive math identities while engaging students in developing the essential knowledge and skills that will accelerate their access to grade level content in the upcoming academic year. To achieve this, SLPs should make use of ● high-quality instructional materials designed to accelerate learning, such as Zearn Math's Summer Intensive Series for kindergarten through grade 8; alongside ● quality STEM programming that engages students in the joyful application of mathematics connected to the real world and their daily lives.

Accommodations and Modifications

LEAs who decide to offer SLPs to students within their jurisdictions must also offer the same program access and opportunity to participate to students with disabilities, and LEAs must be prepared to provide any IEP related modifications or reasonable 504/ADA accommodations.

Sample STEM Lesson Materials

The table below includes resources that leverage best practices and sound connections to the Louisiana Student Standards. This is intended to serve as an example of programming appropriate for STEM summer learning and is in no way an exhaustive list.

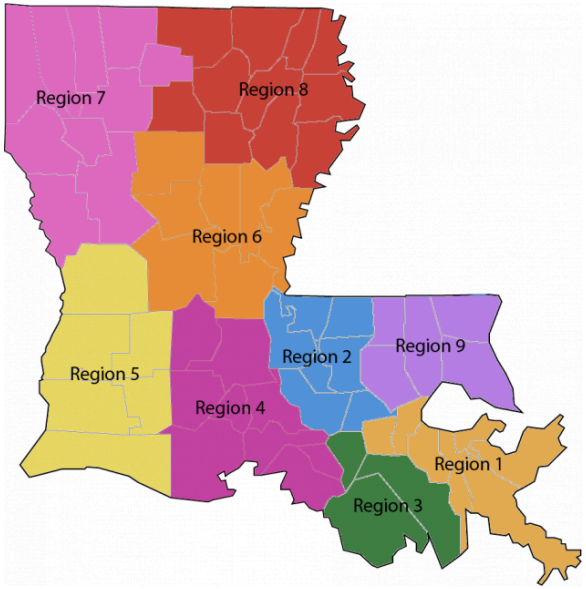
Program name/Description	Suggested grade levels	Professional learning available	Costs associated for access	Easily obtainable supplies needed	Pre-packaged kits available
Sprocket, a portal housing project-based learning courses , includes several units per grade level in each along with lesson plans, slides, and student facing materials to implement within the classroom. Lesson sets and lessons are built upon a driving question to engage students in **three-dimensional learning** and the **engineering design process.** Although designed as year-long curricula, SLPs could leverage one unit per grade level to engage students in meaningful and equitable STEM experiences. In elementary grades, Unit 2:Toys, and middle school, Unit 1: Energy, are examples of units that may stand alone with strong connections to science standards and coherence. (Free sign in required)	3-8		free	☑	☐
The NSTA Daily Do series has single **lessons based on phenomena** such as "What Is a Problem You Want to Design Solutions For?" , which may be used as a springboard for other projects or as an introduction to additional lessons as part of a designed sequence that drives student inquiry through the science and engineering practices. Lessons are divided into elementary, middle, and high school grade bands and can be adapted as needed. Playlists, available at each grade band, each include a series of two or more lessons that may be used to study topics such as force and motion, thermal energy, water, and the digestive system.	K-12		free	☑	☐
NGSS Design Badge Units, instructional materials earning the highest rating using the EQuiP rubric, serve as quality resources that are designed for three dimensions. SLPs may leverage units that complement robust **three-dimensional science learning** that took place during the regular school year. Some units, like OpenSciEd Unit 7.2: How Can We Use Chemical Reactions to Design a Solution to a Problem?, have kits available for purchase. while others such as Why Do Some Things Wash Up on the Beach and Others Don't for Grade 4, make use of readily available materials for hands-on learning.	3-12	Yes, professional learning is available for Open SciEd units.	free	☑	☑

Program name/Description	Suggested grade levels	Professional learning available	Costs associated for access	Easily obtainable supplies needed	Pre-packaged kits available
Engineering is Elementary, curricula available through the Museum of Science, **integrates engineering and computer science** building STEM literacy through application of the engineering design process and real world problem solving. Units, complete with literacy and mathematics connections, are available in grades 1-5 and specialized units for Pre-K and kindergarten students are available. Five units featured as free resources, through a partnership with NASA can be utilized in SLPs in grades 3-8 as a supplement or as stand alone units of study. Free family resources are also available to bridge connections from school to home and expand opportunities in STEM by building positive STEM identities for students.	Pre-K-8	Yes, custom professional learning available for a cost.	☑	☑	☑
Learning Undefeated provides **cross-curricular** STEM activities for students in grade K-8. Currently, ten activities with a duration between 45-60 minutes are available with topics such as magnets, circuit design, and balancing ecosystems. Lesson plans and accompanying materials such as slide show presentations are available to use along with rubrics for tasks. Other materials are available such as games, guest speaker videos, and a STEM skills library.	K-8		free	☑	☐
Teach Engineering provides units, lessons, and maker challenges that are **strongly connected to math and science standards** and support the National Academy of Engineering "habits of mind". A search tool allows easy access to materials based on grade level, standards alignment, duration, and subject area. Utilizing the Engineering Design Process, each activity allows students opportunities to iterate upon designs and engage in **science and engineering practices** through modeling.	K-12	Yes, virtual professional learning available for a cost.	free	☑	☑

Program name/Description	Suggested grade levels	Professional learning available	Costs associated for access	Easily obtainable supplies needed	Pre-packaged kits available
Academic Youth Development (AYD), (created by Agile Mind and the UT Dana Center) integrates **SEL with challenging mathematics**. This resource is curriculum agnostic and supports students in developing habits of mind and actions associated with success in school and the workplace, and provides daily opportunities to apply new learning to challenging problems in mathematics. (Resources)	5-12	Yes, professional learning to support implementation and events are available for a cost.	☑	☑	☐
Code.org includes entire courses or standalone activities on **computer science**, problem solving, artificial intelligence, and other technology related topics which can be leveraged to support technology interaction within SLP's. Lesson plans, translated content, videos, and free professional development are also available.	K-12	Yes, professional learning is available through a regional partner.	free	☑	☐
Scratch allows students opportunities to use **block-based computer programming** tools from MIT to create interactive stories, games and animations which could be easily integrated into arts or ELA. Educator guides and pre-made student resources are available.	3-8		free	☑	☐
Cyber.org offers a variety of lessons in **cybersecurity** through a series of grade level identified self- paced modules. Materials and lessons are shared in a format that can be self paced, class led, or taught by an instructor. Video clips with knowledge checks are utilized to help students navigate cyber safety.	K- 12	Yes, professional learning to support implementation	free	☑	☐

For questions about summer learning content, contact STEM@la.gov

LaSTEM, Louisiana's Regional STEM Network, is a system of STEM leadership entities strategically positioned across Louisiana whereby communities, parishes, multi-parish regions, and the state can achieve improved access to STEM education, participation, and advancement. SLPs may leverage regional resources that may be available through regional STEM network centers to support and enhance STEM experiences. Schools and systems may connect with regional centers to request current offerings and sign up to receive newsletters and communications via the links below.



Regional STEM Network Centers			
Region	**Host Institution**	**Center Name (+ website if available)**	**Point of Contact**
1	GNO, Inc.	**Greater New Orleans Development Foundation/GNO, Inc. STEM Center**	Daphine Barnes dbarnes@gnoinc.org
2	Louisiana State University	**Capital Area STEM**	Summer Dann info@capitalareastem.org
3	Fletcher Technical Community College	Bayou STEM	Christie Landry bayouSTEM@Fletcher.edu
4	University of Louisiana at Lafayette	**UL Lafayette STEM Center**	Angela Boxie angela.boxie@louisiana.edu
5	Calcasieu Parish School Board	**Calcasieu Parish School Board (in partnership with McNeese University) STEM Center**	Mark Arseneault mark.arseneault@cpsb.org
6	Northwestern State University	**Northwestern State University STEM Center**	Jennifer DePriest depriestj@nsula.edu
7	Sci-Port Discovery Center	NWLA LaSTEM Innovation Center	Dr. Heather Kleiner hkleiner@sciport.org
8	Louisiana Tech University	**STEM Collective for Innovative Louisiana Stakeholders (SCILS)**	Cathi Cox-Boniol ccb91110@gmail.com
9	Southeastern University	**Northshore Regional STEM Center**	Wendy Conarro wendy.conarro@selu.edu

Updated March 25, 2024