

# STEM Studio



## **STEM Studio will promote...**

21<sup>st</sup> Century Skills

Critical thinking

Problem solving

Collaboration

Communication

Thinking creatively

Applying technology effectively

Engaging students in real world problems

Innovation

## **What will it look like?**

Science, Technology, Engineering and Math concepts will be explored in a Hands-on, inquiry-based approach.

## Engineering is Elementary



### ***Contextual Learning and Problem Solving.***

Engineering design challenges show students how what they learn in school connects with the world around them.

### ***Collaborative Learning and Teamwork.***

Activities involve small-group work that encourages students to consider more than one solution or idea and work collaboratively.

***Communication.*** Students' develop communication skills and encourage them to share ideas in several ways: speaking, writing, drawing, and building.

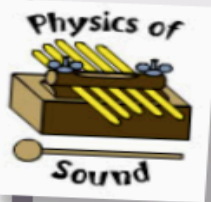
***Project-based Learning.*** Engineering design challenges engage students in inquiry. As they analyze their own data and make decisions about their design, students engage with content, hone their critical-thinking skills, and take ownership of their learning.



# Science Examples

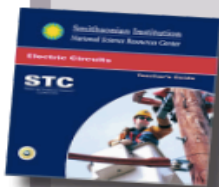


## Engineering & Technology



### Physics of Sound FOSS

The Physics of Sound module consists of four sequential investigations each designed to expose a specific set of concepts. Students learn to differentiate between sounds generated by dropped objects, how sounds can be made louder or softer and higher or lower, how sounds travel through a variety of materials and how sounds get from a source to a receiver. The investigations provide opportunities for students to explore the natural and humanmade worlds by observing and manipulating materials in focused settings using simple tools.

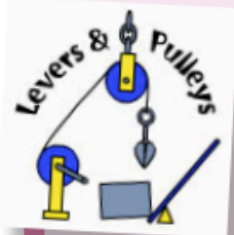


### Electric Circuits STC

In Electric Circuits, students investigate electricity by wiring a circuit to light a bulb. They come to understand that a circuit must form a complete circle through which electric current can pass in order to light the bulb. Students use this knowledge to explore other electrical concepts, such as what conductors and insulators are and how they work and how diodes affect the flow of electricity. Students also learn about the symbolic language of electricity and use it to read and draw diagrams for wiring circuits and constructing a flashlight. Students apply what they learn about electricity and electrical safety to a final activity in which they design and implement a wiring plan for a cardboard house. These activities cultivate students' abilities to analyze problems, think critically and develop solutions.

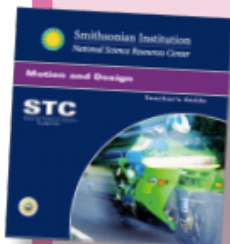
*\*Electric Circuits Literacy Series included with module*

## Physical Science



### Levers & Pulleys FOSS

Humans are the only living creatures that have been able to put materials together to construct machines to do work. Our capacity to see and invent relationships between effort and work produced through simple machines has led us into a world that is becoming more technologically oriented. Knowledge of these relationships is necessary for understanding all mechanics. The Levers and Pulleys module consists of four investigations that involve students in fundamental concepts of simple machines.

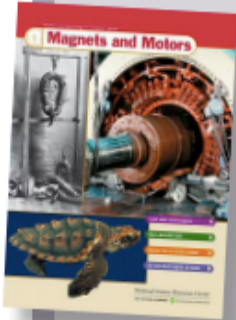


### Motion & Design STC

The Motion and Design unit combines the physics of forces and motion with technological design. Students use plastic construction materials, weights, rubber bands, and propellers to design and build vehicles, then test how those vehicles respond to different forces of motion, like pushes, pulls or rubber band energy. They explore, through experiments and multiple trials, how forces like friction, gravity and air resistance work against motion to slow their vehicles down. Students must apply the concepts they learn to a design challenge, designing a vehicle that can perform to certain specifications but also meets certain "cost" requirements. Collaboratively, student teams must design a vehicle, calculate the cost, test it and refine their design. This unit develops skills in recording design through drawing, making accurate measurements, completing and analyzing data tables, making and testing predictions, and communicating results and experimental data.

*\*Motion & Design Literacy Series included with module*

## Engineering & Technology

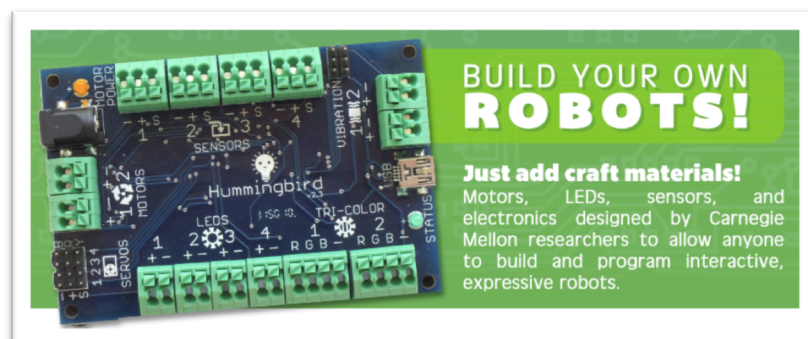


### Magnets & Motors STC

This unit, which builds on the knowledge that students gained in the STC® Electric Circuits unit, offers students the opportunity to explore the properties of magnets and the magnetic properties of electric currents. The unit includes information on the historical development of scientists' understanding of the use of magnetism, electricity and electromagnetism. Students begin by studying magnets and making a compass. They then investigate the relationship between magnetism and electricity, as they explore the characteristics of switches and circuits. Finally, students experiment with three different motors. Applying their learning and experience they dismantle, experiment with and reassemble a manufactured motor.

*\*Magnets & Motors Literacy Series included with module*

## Create LAB at CMU Arts & Bots



## K'NEX

