

Title	SCRATCHing the Grid
By	Eric Stansberry
Primary Subject	STEM (CTE)
Secondary Subject	Computer Science
Grade Level	8th

Description
This lesson will introduce the student to electrical engineering and computer programming. Students will program a game to illustrate the power grid, and create a simulation of some sort of alternative fuel. They will introduce their game/simulation in a conference style presentation.

Materials:

Scratch Research Materials on Alternative Energy, Electric Grid, Circuits and electromagnetism. Google Programming groups for those need extra help. Power Grid sim exploration activities. Scratch Resources Example: https://scratch.mit.edu/projects/1010090/

First Principles of Engineering

	1.0	The Meaning of Engineering
	2.0	Problem Solving
x	3.0	Creative Thinking
	4.0	Engineering Design Process
	5.0	Teaming
x	6.0	Applied Mathematics and Science Knowledge
x	7.0	Computer Tools

	8.0	Modeling
	9.0	Technical and Engineering Communications
	10	Graphics
	11	Ethics
	12	Time Management
	13	Project Management
	14	Role of Engineers and Engineering in Society

ITEEA:

	1.0	Students will develop an understanding of the characteristics and scope of technology.
x	2.0	Students will develop an understanding of the core concepts of technology.
x	3.0	Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.
	4.0	Students will develop an understanding of the cultural, social, economic, and political effects of technology.
	5.0	Students will develop an understanding of the effects of technology on the environment.
	6.0	Students will develop an understanding of the role of society in the development and use of technology.
	7.0	Students will develop an understanding of the influence of technology on history.
	8.0	Students will develop an understanding of the attributes of design.
x	9.0	Students will develop an understanding of engineering design.

x	10.0	Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.
x	11.0	Students will develop the abilities to apply the design process.
	12.0	Students will develop the abilities to use and maintain technological products and systems.
	13.0	Students will develop the abilities to assess the impact of products and systems.
	14.0	Students will develop an understanding of and be able to select and use medical technologies.
	15.0	Students will develop an understanding of and be able to select and use agricultural and related biotechnologies.
	16.0	Students will develop an understanding of and be able to select and use energy and power technologies.
	17.0	Students will develop an understanding of and be able to select and use information and communication technologies.
	18.0	Students will develop an understanding of and be able to select and use transportation technologies.
	19.0	Students will develop an understanding of and be able to select and use manufacturing technologies
	20.0	Students will develop an understanding of and be able to select and use construction technologies.

Ask: Define the problem and understand what to work on.

How does the power grid work?
 How can I create a game, or a visual representation of the chosen topic?

Imagine: Brainstorm to come up with a wide range of ideas or solutions to their problem.

Plan: Pick one promising idea and then develop a plan.

Create: Emphasize teamwork and follow the plan.

Experiment: Do the experiments, measure, record and ask how to improve their design.

Improve: Changes are made to the original model to come up with the best solution.

Procedures:

1. Students will select a topic to research
 2. They will use the program SCRATCH, to create a game using the theme they selected.
 3. Students will create a multi-media report about their topic to supplement their game.
 4. They will present both the game, and presentation at a “STEM media” event at the school.

Day 1

Students will be introduced to the power grid and how it works. They will create accounts on Energyville and will use the simulation to work with their city.

Day 2

Students will pick a renewable energy resource to research and prepare a multimedia presentation on the topic. They will also begin planning a game, or simulation that will illustrate either the power grid or some renewable resource.

Day 3 to Day 7

Students will write their programs, debug, and perfect the programs preparing for their presentations.

Day 8 and 9

Students will present their game/simulation in a conference style format, and will be graded by their peers.