

Engineering For Kids

Girl Scout Badge Correlations



Girls Scouts just introduced new STEM badges to offer girls even more opportunities to learn skills and empower themselves with the experiences they need to succeed in life. Engineering For Kids has the lessons needed to help your Girl Scout troop acquire their badges. Contact us at mpls@engineeringforkids.net or call (763) 473-0362 to discuss this awesome opportunity!

Daisy Badges

Kindergarten and 1st Grade



Design a Robot

Corresponding Engineering For Kids Lessons:

Junior Robotics:

- Any Lesson from the Manual (60-minute workshop)

Junior Summer Camp - Inventor's Workshop:

- Robot Wind-Up (60-180-minute workshop)
- Sketch Bot (60-180-minute workshop)
- Tinker Bot (60-180-minute workshop)



How Robots Move

Corresponding Engineering For Kids Lessons:

Junior Robotics:

- Any Lesson from the Manual (60-minute workshop)

Junior Summer Camp - Inventor's Workshop:

- Robot Wind-Up (60-180-minute workshop)
- Sketch Bot (60-180-minute workshop)
- Tinker Bot (60-180-minute workshop)



Model Car Design Challenge

Corresponding Engineering For Kids Lessons:

Junior Mechanical Engineering:

- Rolling Rambler (60-minute workshop)



Roller Coaster Design Challenge

Corresponding Engineering For Kids Lessons:

Junior Mechanical Engineering:

- Marble Roller Coaster (60-minute workshop)



What Robots Do

Corresponding Engineering For Kids Lessons:

Junior Robotics:

- Any Lesson from the Manual (60-minute workshop)

Junior Summer Camp - Inventor's Workshop:

- Robot Wind-Up (60-180-minute workshop)
- Sketch Bot (60-180-minute workshop)
- Tinker Bot (60-180-minute workshop)



Computer Expert

Corresponding Engineering For Kids Lessons:

LEGO® Robotics – Robotics 101:

- Robot Intelligence (180-minute workshop)

Electronic Game Design:

- Pong Session (90-minute workshop)



Designing Robots

Corresponding Engineering For Kids Lessons:

LEGO® Robotics – Robotics 101:

- Robot Intelligence (180-minute workshop)
- Bouncing off the Walls (180-minute workshop)
- Sumobots (180-minute workshop)

LEGO® Robotics – Envirobots:

- Smart Food Miles (180-minute workshop)
- Rapid Recycle (180-minute workshop)



Fling Flyer Design Challenge

Corresponding Engineering For Kids Lessons:

Aerospace Engineering:

- Airplanes (90-minute workshop)
- Straw Rockets (90-minute workshop)
- Bottle Rockets (90-minute workshop)



Home Scientist

Corresponding Engineering For Kids Lessons:

Chemical Engineering:

- Utility Dough (90-minute workshop)
- Ice Cream Factory (90-minute workshop)



Inventor

Corresponding Engineering For Kids Lessons:

Any Engineering For Kids lesson could be used for this badge. Including:

- Electrical Engineering: Flashlight Builder (60-90-minute workshop)
- Environmental Engineering: Soda Ring Challenge (60-90-minute workshop)
- Aerospace Engineering: Lunar Lander (90-minute workshop)
- Industrial Engineering: It's a Breeze (60-90-minute workshop)
- Mechanical Engineering: Coasters 101 (90-minute workshop)
- Birthday Party Add-On: Lip Gloss + Flub (60-90 minute workshop)



Programming Robots

Corresponding Engineering For Kids Lessons:

LEGO® Robotics – Robotics 101:

- Arm Flexing (180-minute workshop)

LEGO® Robotics – DaVini's Designs

- Smart Siege (180-minute workshop)

LEGO® Robotics – Envirobots:

- Solar Roller (180-minute workshop)



Race Car Design Challenge

Corresponding Engineering For Kids Lessons:

Mechanical Engineering:

- Rubber Band Racer (90-minute workshop)
- Custom Dragster (90-minute workshop)



Showcasing Robots

Corresponding Engineering For Kids Lessons:

LEGO® Robotics - RoboGames

- Hungry, Hungry Robots (180-minute workshop)
- Paddleball Smash 'em (180-minute workshop)

LEGO® Robotics – Robo Battles:

- Tug of War (180-minute workshop)
- Jousting (180-minute workshop)
- Sumo Bots (180-minute workshop)



Snacks

Corresponding Engineering For Kids Lessons:

Chemical Engineering:

- Ice Cream Factory (90-minute workshop)
- Utility Dough (90-minute workshop)



Animal Habitats

Corresponding Engineering For Kids Lessons:

Environmental Engineering:

- Soda Ring Challenge (60-90-minute workshop)
- Slick Solutions (60-minute workshop)



Designing Robots

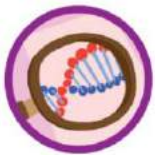
Corresponding Engineering For Kids Lessons:

LEGO® Robotics – Robotics 101:

- Robot Intelligence (180-minute workshop)
- Bouncing off the Walls (180-minute workshop)
- Sumobots (180-minute workshop)

LEGO® Robotics – Envirobots:

- Smart Food Miles (180-minute workshop)
- Rapid Recycle (180-minute workshop)



Detective

Corresponding Engineering For Kids Lessons:

Environmental Engineering:

- Purify It! (60-minute workshop)
- Slick Solutions (60-minute workshop)

Engineer Investigators – Summer Camp:

- Crack the Code (60-minute workshop)
- Identification Lab (60-minute workshop)
- Car Crash Clean-Up (60-minute workshop)
- Ransom (60-minute workshop)
- Liar, Liar (60-minute workshop)



Entertainment Technology

Corresponding Engineering For Kids Lessons:

Mechanical Engineering:

- Coasters 101 (90-minute workshop)

Aerospace Engineering:

- Straw Rockets (90-minute workshop)

Electrical Engineering:

- Levitrons (90-minute workshop)

Electronic Game Design:

- Pong Session (90-minute workshop)

LEGO Robotics Mindstorms:

- Robot Intelligence (180-minute workshop)



Musician

Corresponding Engineering For Kids Lessons:

Junior Mechanical Engineering - Toys:

- Good Vibrations Guitar (60-minute workshop)

Hardware Engineering:

- Veggie Potato (90-minute workshop)
- Kelvin's Guitar (90-minute workshop)



Product Designer

Corresponding Engineering For Kids Lessons:

Chemical Engineering:

- Utility Dough (90-minute workshop)

Electrical Engineering:

- Flashlight Builder (60-90-minute workshop)

Mechanical Engineering:

- Catapults (90-minute workshop)

Aerospace Engineering:

- Lunar Lander (60-90-minute workshop)

Industrial Engineering:

- It's a Breeze (60-90-minute workshop)

Birthday Party Manual:

- Add-On: Lip Gloss + Flub (60-90 minute workshop)



Programming Robots

Corresponding Engineering For Kids Lessons:

LEGO® Robotics - Robotics 101:

- Arm Flexing (180-minute workshop)

LEGO® Robotics - DaVini's Designs

- Smart Siege (180-minute workshop)

LEGO® Robotics - Envirobots:

- Solar Roller (180-minute workshop)



Showcasing Robots

Corresponding Engineering For Kids Lessons:

LEGO® Robotics - RoboGames

- Hungry, Hungry Robots (180-minute workshop)
- Paddleball Smash 'em (180-minute workshop)

LEGO® Robotics - Robo Battles:

- Tug of War (180-minute workshop)
- Jousting (180-minute workshop)
- Sumo Bots (180-minute workshop)



Simple Meals

Corresponding Engineering For Kids Lessons:

Chemical Engineering:

- Ice Cream Factory (90-minute workshop)



Special Agent

Corresponding Engineering For Kids Lessons:

Environmental Engineering:

- Purify It! (60-minute workshop)
- Slick Solutions (60-minute workshop)

Engineer Investigators – Summer Camp:

- Crack the Code (60-minute workshop)
- Identification Lab (60-minute workshop)
- Car Crash Clean-Up (60-minute workshop)
- Ransom (60-minute workshop)
- Liar, Liar (60-minute workshop)

Engineering For Kids

Boy Scout Adventure Loops, Adventure Pins and Merit Badge Correlations



Contact Engineering For Kids of Minneapolis at mpls@engineeringforkids.net or (763) 473-0362.

Tiger Scout Adventure Loops



Floats and Boats

Requirement: Build a boat from recycled materials, and float it on the water.

Corresponding Engineering For Kids Lessons:

Junior Marine Engineering:

- Paddleboats (45-minute workshop)
- Row Your Boat (45-minute workshop)
- Smooth Sailing (45-minute workshop)

Wolf Scout Adventure Loops



Air of the Wolf

Requirement: Make a paper airplane and fly it five times. Make a change to its shape to help it fly farther. Try it at least five times.

Corresponding Engineering For Kids Lesson:

Aerospace Engineering:

- Airplanes (60 - 120-minute workshop)



Code of the Wolf

Requirement: Use a secret code using numbers to send a message to one of your den members or your den leader. Have that person send a message back to you. Be sure you both use the same code numbers. Send a message to another member of your den or your den leader using the pig pen code or another code that changes letters into special shapes

Corresponding Engineering For Kids Lesson:

Engineer Investigators:

- Cracking the Code (60 - 120-minute workshop)



Motor Away

Requirement: Create and fly three different types of paper airplanes. Before launching them, record which one you believe will travel the farthest and what property of the plane leads you to make that prediction.

Corresponding Engineering For Kids Lesson:

Aerospace Engineering:

- Airplanes (60 - 120-minute workshop)

Requirement: Make two different boats and sail them. Choose different shapes for your boats.

Corresponding Engineering For Kids Lessons:

Marine Engineering:

- Paddleboats (60 - 120-minute workshop)
- Powerboats (60 - 120-minute workshop)
- New Canoe (60 - 120-minute workshop)

Requirement: Create a car that moves under its own power.

Corresponding Engineering For Kids Lessons:

Marine Engineering:

- Rubber Band (60 - 120-minute workshop)
- Custom Dragster (60 - 120-minute workshop)

Bear Scout Adventure Loops



Forensics

Requirement: Analyze your fingerprints.

Corresponding Engineering For Kids Lesson:
Engineer Investigators – Summer Camp:

- Identification Lab (60 – 120-minute workshop)

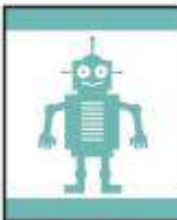
Requirement: Learn about chromatography and how it is used in solving crimes. Do an investigation using different types of black, felt-tip markers. Share your results with your den.

Corresponding Engineering For Kids Lessons:
Engineer Investigators – Summer Camp:

- Ransom (60 – 120-minute workshop)

Chemical Engineering:

- Chromatography (60 – 90-minute workshop)



Robotics

Requirement: Learn about some instances where a robot could be used in place of a human for work. Research one robot that does this type of work, and present what you learn to your den.

Corresponding Engineering For Kids Lessons:
LEGO® Robotics – Robotic Surgeons:

- Setting a Bone (60 – 120-minute workshop)
- Harmful Bacteria (60 – 120-minute workshop)
- Robototherapy (60 – 120-minute workshop)

Requirement:

- Identify six tasks performed by robots.
- Build a robot hand. Show how it works like a human hand and how it is different from a human hand.
- Build your own robot.

Corresponding Engineering For Kids Lessons:
Robotic Engineering Manual – COMING SOON!



Super Science

Requirement: Do a sink-or-float investigation. Explain what you learned.

Corresponding Engineering For Kids Lessons:
Marine Engineering:

- Boat Basics (60 – 120-minute workshop)
- New Canoe (60 – 120-minute workshop)

Sail the Seas – Summer Camp Manual:

- Ship Building (90 – 120-minute workshop)

Webelos and Arrow of Light Pins



Cast Iron Chef

Requirement: Prepare a balanced meal for your den or family; utilize one of the methods below for preparation of part of your meal:

- a. Camp stove
- b. Dutch oven
- c. Box oven
- d. Solar oven
- e. Open campfire or charcoal

Corresponding Engineering For Kids Lesson:

Junior Camp Kelvin – Summer Camp Manual:

- Turn Up the Heat (60 - 90-minute workshop)



Engineer

Requirement: Learn to follow engineering design principles by doing the following:

- a. Examine a set of blueprints. Using these as a model, construct your own set of blueprints or plans to design a project.
- b. Using the blueprints or plans from your own design, construct your project. Your project may be something useful or something fun.
- c. Share your project

Corresponding Engineering For Kids Lessons:

Any Lesson from any of the Engineering Manuals would meet the requirements of this pin.

Requirement: Explore other fields of engineering and how they have helped form our past, present, and future.

Corresponding Engineering For Kids Lessons:

Any Lesson from any of the Engineering Manuals would meet the requirements of this pin.

Requirement: Pick and do two projects using the engineering skills you have learned.

Corresponding Engineering For Kids Lessons:

Any Lesson from any of the Engineering Manuals would meet the requirements of this pin.



Game Design

Requirement:

- Decide on the elements for your game.
- Create your game.
- Teach an adult or another Scout how to play your game.

Corresponding Engineering For Kids Lessons:

Any Game Design Manual will fulfill the requirements (Full 6-week Program)



Maestro!

Requirement: Make a musical instrument. Play it for your family, den, or pack.

Corresponding Engineering For Kids Lessons:

Hardware Engineering:

- Veggie Piano (60 – 90-minute workshop)
- Kelvin's Guitar (60 – 90-minute workshop)



Adventures in Science

Requirement: With adult supervision, build and launch a model rocket. Use the rocket to design a fair test to answer a question about force or motion.

Corresponding Engineering For Kids Lessons:

Aerospace Engineering:

- Straw Rockets (60 – 90-minute workshop)
- Bottle Rockets (60-minute workshop)

Merit Badges



Chemistry

Requirement: Construct a Cartesian diver. Describe its function in terms of how gases in general behave under different pressures and different temperatures. Describe how the behavior of gases affects a backpacker at high altitudes and a scuba diver underwater.

Corresponding Engineering For Kids Lesson:

Marine Engineering:

- Cartesian Diver (60 – 90-minute workshop)



Inventing

Requirement: Think of an item you would like to invent that would solve a problem for your family, troop, chartered organization, community, or a special-interest group. Then do EACH of the following, while keeping a notebook to record your progress.

- a. Talk to potential users of your invention and determine their needs. Then, based on what you have learned, write a statement describing the invention and how it would help solve a problem. This statement should include a detailed sketch of the invention.
- b. Create a model of the invention using clay, cardboard, or any other readily available material. List the materials necessary to build a prototype of the

invention.

- c. Share the idea and the model with your counselor and potential users of your invention. Record their feedback in your notebook.

Corresponding Engineering For Kids Lesson:

Any Lesson from any of the Engineering Manual would meet the requirements of this badge.

Requirement: Build a working prototype of the item you invented for the requirement above. Test and evaluate the invention. Among the aspects to consider in your evaluation are cost, usefulness, marketability, appearance, and function. Describe how your original vision and expectations for your invention are similar or dissimilar to the prototype you built. Have your counselor evaluate and critique your prototype.

Corresponding Engineering For Kids Lesson:

Any Lesson from any of the Engineering Manual would meet the requirements of this badge.



Model Design and Building

Requirement: Complete a mechanical model. Build a model of a mechanical device that uses at least two of the six simple machines. After completing the model, present it to your counselor. Be prepared to discuss materials used, the machine's function, and any difficulty you might have encountered.

Corresponding Engineering For Kids Lessons:

Mechanical Engineering:

- Custom Dragster (60 – 90-minute workshop)
- Rubber Band Racer (60 – 90-minute workshop)



Robotics

Requirement: Design, build, program, test. Do each of the following:

- a. choose a task for the robot or robotic subsystem that you plan to build. Include sensor feedback and programming in the task.
- b. Design your robot. The robot design should use sensors and programming and have at least 2 degrees of freedom.
- c. Build a robot or robotic subsystem of your original design to accomplish the task you chose.
- d. Program your robot to perform the task you chose.

Corresponding Engineering For Kids Lessons:

LEGO® Robotics – Robotics 101:

- Bouncing off the Walls (90 – 120-minute workshop)
- Line Follow (90 – 120-minute workshop)

Requirement: Test your robot and record the results in your robot engineering notebook. Include suggestions on how you could improve your robot, as well as pictures or sketches of your finished robot.

Corresponding Engineering For Kids Lesson:

Robotic Surgeons:

- Medical Intern (90 – 120-minute workshop)