



MEETING PLANS & IDEAS: ENGINEERING

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OBJECTIVES

This month's activities should:

- Define the different branches of engineering.
- Help Scouts understand what engineers do.
- Demonstrate key engineering concepts.
- Demonstrate real-world applications of engineering principles.
- Encourage Scouts to earn the [Nova and Supernova awards](#).

LEADERSHIP PLANNING

As a leadership team, you may want to discuss the following items when choosing engineering as your program feature during your planning meetings.

- Are there adults in our unit who are engineers or might be able to speak about how they solve difficult technical problems at their place of work?
- What videos will you show?
- Who will be able to discuss mechanical, chemical, electrical, and civil concepts in great detail?
- How can we involve parents?
- What engineering-related merit badges should we focus on?
- Is there an amusement park or carnival nearby?
- Where will we host our main event?
- Will the main event be an overnighter?
- To meet our needs, what should we change in the sample planning meetings?r needs better?

ACTIVITY	DESCRIPTION	WEEK	DATE	YEAR
Preopening	Preopening activities			
Opening Ceremony	Opening Ceremony			
Service	Service			
Main Activities	Main Activities			
Closing	Closing			

[Click above for fillable troop meeting planning form.](#)

PREOPENING IDEAS

[Preopening Ideas on Troop Program Resources](#)

- Play a video from a TV show such as “Modern Marvels” that demonstrates how a building or bridge is constructed. Alternatively, show a video of how a wastewater treatment plant operates. (Note: Shows such as “Modern Marvels” often post two- to three-minute videos on their [YouTube Channel](#).)
- Play a video from a TV show such as “How It’s Made” that demonstrates how chemical reactions transform objects.
- Play a video of [How a Car Engine Works](#), and [How a Jet Engine works](#).
- Play a video that demonstrates [How a CPU is Made](#).

OPENING IDEAS

[Opening Ideas on Troop Program Resources](#)

GROUP INSTRUCTION IDEAS

Introduction and Civil Engineering

- Discuss the following:
 - The definition of engineering
 - The different areas within engineering
 - The basics of civil engineering and the types of work these engineers do

Chemical Engineering

- Discuss the following:
 - The basics of chemical engineering and the types of work these engineers do
 - The definition of compounds, polymers, basics, and acids

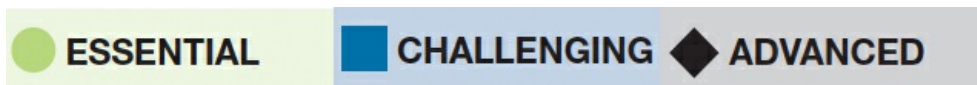
Mechanical Engineering

- Discuss the following:
 - The basics of mechanical engineering and the types of work these engineers do
 - Definition of drag, torque, hydraulics, and other mechanical systems



Electrical Engineering



- Discuss the following:
 - The basics of electrical engineering and the types of work these engineers do
 - What a circuit is and what a resistor, diode, inductor, and capacitor do



SKILLS INSTRUCTION IDEAS





Introduction and Civil Engineering


-  • Build a water filtration system.
 -  • Experiment with numerous materials to see which ones work best at cleaning the water.
 - Discuss how your local water treatment plant works.
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-  • Build a model dam. Experiment with a number of materials and designs to determine which ones work better as the volume of water increases.
 -  • Discuss how dams are used to provide water and electricity to municipal areas.
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-  • Build a cable-stayed bridge that is at least 3 feet long, 2 feet off the ground, and has three or more cables on each side of the tower.
-  • Ensure the bridge is capable of holding up a few toy cars.
- Discuss how cable length and the distances between cables help the deck of the bridge stand.


Chemical Engineering


-  • Make some goo similar to the details listed at ScienceBob.com
 -  • Lead a discussion on polymers and the reaction you just witnessed.
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-  Build pop rockets and see which design goes the farthest. [Use the experiment outline here.](#)
 - Lead a discussion on the chemical reaction that causes the rockets to pop off the launch pad.
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-  Build a model rocket from a kit available at your local hobby store. Have Scouts experiment with different fin designs and engines.
 - Lead a discussion on the chemical reaction that is occurring within the rocket engine and how it is similar to or different from the engines used in modern spacecraft.


Mechanical Engineering


-  Have Scouts build string telephones. Lead a discussion on sound waves and how sound is changed by objects such as water.
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-  Build a Rube Goldberg machine and see which team of Scouts can come up with the wackiest way to accomplish an everyday task.
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-  Calculate the mechanical advantage of a pulley. Discuss how pulleys and levers are used to construct a building or lift an elevator. A great example of a similar activity can be found at [GFI Lesson: Lift & Pull.](#)

Electrical Engineering

-  Take apart a flashlight, and discuss the components that are used in it to complete the circuit.
 - Have Scouts assemble their own LED flashlight using an LED, tape, and a CR2032 battery.
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-  Disassemble a variety of broken electronics.
 - Explore how each is designed, the components utilized, and the similarities in design.
 - See if Scouts can diagnose the problem that may have caused the item to stop working.
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-  Have Scouts assemble their own USB charging kit. See [Maker Shed USB MiniBoost Charger.](#)

BREAKOUT GROUP IDEAS

Advancement and Award Topics

- Choose an engineering-related merit badge or [Nova Award](#) to work on together.

Getting Ready for the Main Event

- Menu Planning (if applicable)
- Duty Roster Planning (if applicable)
- Patrols discuss what special items they will need for the main event.

Preparation for the meeting's game or challenge

GAME AND CHALLENGE IDEAS

Library of Games and Challenges on Troop Program Resources

- [Sky High](#)
- **Parachute Races**
 - *Materials:* A plastic bag or lightweight fabric, scissors, string, a small object to act as the weight
 - *Method:* Give teams of Scouts five minutes to design a parachute for the weighted object. Explain that their objective is to create a parachute that is the last one to touch the ground when all are released at the same time from a given height.
 - *Scoring:* The last parachute to touch the ground wins.
- **Geocache Scavenger Hunt**
 - *Materials:* Two to three GPS units, prizes, paper, pen
 - *Method:* Before the meeting, hide prizes around your meeting area. With each prize, include the GPS coordinates leading to the next prize. Divide Scouts into the same number of teams as there are GPS units. Give each team the coordinates of the first prize. The first team to find all the items wins.
 - *Scoring:* The first team to find all the items wins.
- **Balloon Blowup**
 - *Materials:* Effervescent tablets (like Alka-Seltzer), 9" balloons, 500 ml plastic water bottles, water
 - *Method:* Fill the bottles 3/4 to the top with water. Stretch out a balloon and fill the deflated balloon with four Alka-Seltzer tablets broken into small pieces. Squeeze the pieces inside the balloon, breaking them into even smaller pieces, and place the end of the balloon over the mouth of the bottle making sure that none of the Alka-Seltzer gets into the bottle. When ready, lift the balloon into a vertical position over the bottle and empty the contents into the water. Watch as the balloon inflates.
 - *Explanation:* Alka-Seltzer contains sodium bicarbonate (baking soda) and citric acid. When you drop a tablet into water it forms sodium citrate, water and carbon dioxide which is the bubbles of gas you see. The gas has nowhere to go except into the balloon.

CLOSING IDEAS

- [Leader's Minutes](#)
- [Ceremony](#)

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TROOP LEADER RESOURCE LINKS

[Advancement Resources](#)

[Awards Central](#)

[Boy Scouts](#)

[Guide to Safe Scouting](#)

[SCOUTBOOK](#)

[Scouting Forms from the National Council](#)

[ScoutCast](#)

[Scouting Magazine](#)

[ScoutStuff.org \(Retail Site\)](#)

[ScoutingWire](#)

[Sign in to MyScouting.org](#)

[Take Youth Protection Training](#)

[The Outdoor Adventure Planning Guide](#)

[Troop Leader Guidebook Appendix](#)

[Uniforms](#)