TECHNOLOGY

Better Living Through Innovation

Technology is all around us, from our homes to our schools to the great outdoors. While we tend to think of technology as the latest electronic gadget, any invention that makes our lives easier could be considered an application of technology. The cellphone in your pocket is an example of technology, but so is the high-tech fabric of your pants—and so is the technology that allowed your pants to be mass-produced and shipped to your favorite store.

Technology has produced incredible tools and devices that make our lives more interesting and fun. This month's meetings and outings will focus on some that relate to your life in Scouting.

Objectives
This month's activities should:

- Define technology.
- Allow Scouts to become familiar with technology used in Scouting.
- Teach Scouts to be safe while using technology.
- Make Scouts better leaders in the use of technology.
- Demonstrate how technology is developed and how it affects society.
- Encourage Scouts to be better technology consumers.

RELATED ADVANCEMENT AND AWARDS

- Cyber Chip
- Automotive Maintenance, Aviation, Canoeing, Cycling, Drafting, Electricity, Energy, Farm Mechanics, Motorboating, Nuclear Science, Railroading, Small-Boat Sailing, Space Exploration, and Truck Transportation merit badges
- Boy Scout and Venturing Nova and Supernova awards

Leadership Planning

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

1. What areas of technology do we want to focus on?

2. Who do we know who could help facilitate this month's meetings and activities?

3. Who in our unit has earned a Nova or Supernova award?

4. Do we want to focus on the Nova and Supernova awards this month?

5. Should we incorporate completion of the Cyber Chip into this month's meetings?

6. To meet our needs, what should we change in the sample meeting plans?

PARENTS CAN HELP WITH THE TECHNOLOGY PROGRAM FEATURE BY:

1. Identifying subject experts who can help with meetings and activities

2. Sharing their experiences with technology and how technology has changed over their lifetimes

3. Encouraging the appropriate use of communication technology

4. Encouraging safe internet use at home by parents and Scouts

5. Maintaining current Youth Protection certification, which is required of all adults providing transportation for or participating in outings

TECHNOLOGY INFORMATION

Technology is a broad area of public endeavor that includes computers, transportation, manufacturing, communications, robotics, and countless other topics. With your parent's permission, you can use an internet search engine to find information that interests you.

Topics to explore can include:

GPS units

- The science behind how they work
- Other factors necessary to make the technology functional
- Comparison to the old technology of using a compass

Cellphones

- The science behind how they work
- Other factors necessary to make the technology functional
- Exploration of the development of cellphones and discussion of potential future developments

Robotics

- The science behind how robots are designed and programmed
- How hobby robots compare with those used in engineering and manufacturing
- The availability of robotics competitions in your area.

Cyber Chip

Staying safe online is an important skill today's Scouts need. To help families and volunteers keep youth safe while online, the Boy Scouts of America introduced the Cyber Chip. In developing this tool, the BSA teamed up with content expert NetSmartz®, part of the National Center for Missing and Exploited Children® and training expert for many law enforcement agencies. You can learn more at www.scouting.org/training/youth-protection/cyber-chip.

Requirements for Grades 6–8

1. Read and sign the Level II Internet Safety Pledge from NetSmartz® (BSA Cyber Chip green card).

2. Write and sign a personalized contract with your parent or guardian that outlines rules for using the computer and mobile devices, including what you can download, what you can post, and consequences for inappropriate use.

3. Watch the video "Friend or Fake," along with two additional videos of your choosing, to see how friends can help each other to stay safe online (www.netsmartz.org/scouting).

4. As an individual or with your patrol, use the EDGE method and mini lessons to teach internet safety rules, behavior, and "netiquette" to your troop or another patrol. You are encouraged to use any additional material and information you have researched. Each member of the patrol must have a role and present part of the lesson (www.netsmartz.org/scouting).

5. Discuss with your unit leader the acceptable standards and practices for using allowed electronic devices such as phones and games at your meetings and other Scouting events.

Requirements for Grades 9–12

1. Read and sign the Level II Internet Safety Pledge (BSA Cyber Chip green card).

2. Write and sign a personalized contract with your parent or guardian that outlines rules for using the computer and mobile devices, including what you can download, what you can post, and consequences for inappropriate use.

3. Discuss with your parents the benefits and potential dangers teenagers might experience when using social media. Give examples of each.

4. Watch three "Real-Life Story" videos to learn the impact on teens (www.netsmartz.org/scouting).

5. As an individual or patrol, use the EDGE method and the Student Project Kit to teach internet safety rules, behavior, and "netiquette" to your troop or another patrol. You are encouraged to use any additional material and information you have researched. Each member of the patrol must have a role and present part of the lesson (www.netsmartz.org/scouting).

6. Discuss with your unit leader the acceptable standards and practices for using allowed electronic devices such as phones and games at your meetings and other Scouting events.

Nova and Supernova Awards

Scouts and Venturers can earn special awards for learning more about STEM (science, technology, engineering, and math). Here's an introduction.

Nova Awards. The Nova Awards allow Scouts and Venturers to discover some of the basic principles of STEM and to experience science, technology, engineering, and mathematics in fun and interesting ways. Nova activities are fairly basic and are designed to spark interest in one or all of the categories of awards. They are straightforward to complete and offer a quick reward in the form of the Nova patch for the first award earned and a pi (π) pin to attach to the Nova patch for each additional award earned. Each Nova Award can be accomplished fairly easily in a few weeks.

Supernova Awards. The Supernova Awards require a deeper level of understanding and effort. They challenge Scouts and Venturers who have a greater interest in the STEM fields to experiment, understand the outcomes of these experiments, and present their findings to their Supernova mentor. The focus is to build on the basic STEM topics with activities that will result in greater learning and an increasing complexity in the youth's knowledge. Completing the requirements takes more work and includes some research. Completion of a Supernova Award earns the Scout or Venturer the right to wear the Supernova Award medal. Most Supernova activities will take several weeks or months to complete.

You can learn more at www.scouting.org/stem-nova-awards.

The Scout Law and Cybersafety/Cyberbullying

Today we are online more than ever before. We use technology to save us time with research, connect with others, navigate, and have fun. Here are some ideas of how the digital world and the Scouting community can live side by side.

Trustworthy. Be truthful with others online, and be very careful of the information you share. Do the right thing when sharing other people's words or pictures. Make sure you have the owner's permission before using them.

Loyal. Share information about others only if you have their permission to share it. Uphold appropriate agreements you make with friends when you play games with them.

Helpful. Alert others to scams, cheats, and suspicious sites. Point them to reliable and accurate sources of information. Encourage people to report bad behavior online.

Friendly. Reach out to support others who are doing good things, like posting quality creative works. Support those who are bullied.

Courteous. Be polite and respectful. When you use other people's work, be sure to ask permission when necessary, follow fair use standards, and give credit to the people who created and own the work.

Kind. Treat people with respect when you are on social networks, playing games, talking or texting on a cellphone, or in other digital activities.

Obedient. When using digital devices, follow the rules set by your parents/guardians, teachers, and Scout leaders. Abide by the rules established by sites, services, devices, and games.

Cheerful. Use games, messaging tools, and social forums to build your relationships with others while having fun.

Thrifty. Be a smart consumer. Know your voice, text, and data plans and use them wisely. Be sure to study digital devices and services you want. Before buying them, make sure you're not overspending on functions and features you won't need. Be careful not to run up charges on apps and sites.

Brave. Stand up for what is right. Do not participate in mocking and bullying others, even if your friends are doing it. Report suspected abuse to a trusted adult, like your parent or leader; call 911 or call the Cyber Tipline at 1-800-843-5678. If the incident involves any part of the Scouting program, call your council Scout executive immediately. In an emergency, if the Scout executive is not available, call the Scouts First Helpline at 1-844-SCOUTS1 (1-844-726-8871).

Clean. Use clean language and discuss only appropriate topics when using digital devices to communicate with others.

Reverent. Respect the feelings of other people. Do not use digital devices to spread irreverent ideas.
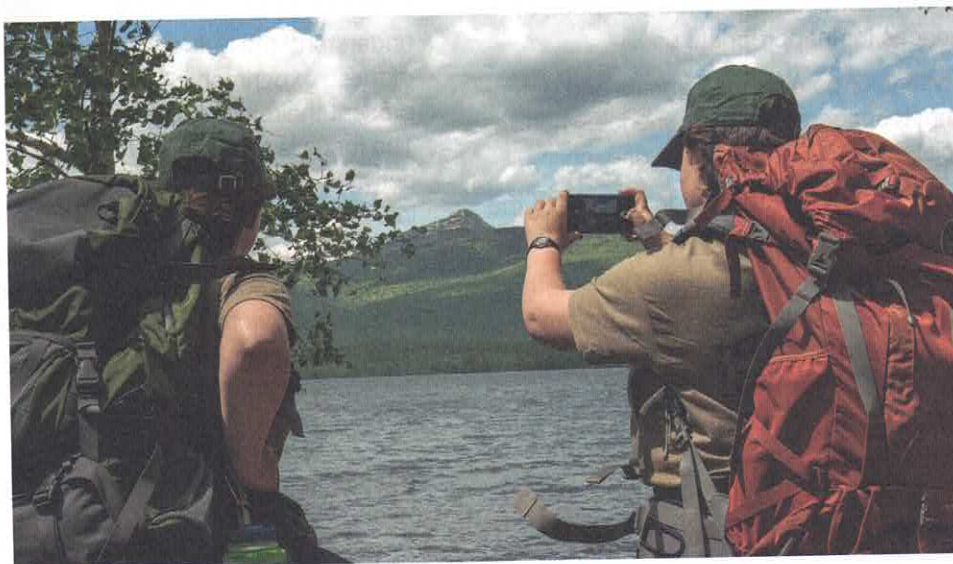
TECHNOLOGY GAMES

Nitro Transport

Equipment: For each team, an open can, a transport device (a 12-inch-square board with six 8-foot ropes attached), water

How to play: Each team must move a can of "radioactive nitroglycerin" (can full of water) from point A to point B (a distance of 25 to 30 feet) by lifting the can with the transporting device. All groups must pick it up at the same time without spilling the liquid.

Scoring: The group that moves the nitro to the destination first without spilling wins.

Notes: After the game, discuss the dangers of transporting hazardous fuel. Explore how gasoline, natural gas, and nuclear fuel are transported.

Photo Scavenger Hunt

Equipment: For each team, a smartphone and a computer with internet access

How to play: Teams go around your meeting place and photograph an assigned list of items (e.g., tree), actions (e.g., high five), and/or concepts (e.g., happy). They then upload their photos to an assigned multimedia website like Flickr, Instagram, or Facebook.

Scoring: The first team to upload its photos wins.

Variation: You could assign more subjects than teams have time to photograph. They would then have to manage their time in order to shoot and upload as many photos as possible; teams that miss the deadline would be disqualified.

Find What They Hid

Equipment: For each team, a GPS receiver and an object to hide

How to play: Teams hide objects, noting the GPS coordinates. They then give those coordinates to other teams to find.

Scoring: Award points to teams that find objects, as well as to those that have their objects found.

Notes: To increase the challenge, don't identify the objects. Instead, give GPS coordinates and clues or riddles that hint at what the objects are.

Tech Timeline

Equipment: For each team, a set of 15 to 20 cards showing milestones in the history of technology (e.g., the first telephone call, the introduction of the Model T, the first personal computer)

How to play: Before the game, tape or pin each team's cards in random order on one wall of the room. Teams line up relay-style at the other end of the room. On signal, the first player on each team runs forward and relocates two cards to be in the correct order. They then run back to tag the next player, who can also relocate two cards. Continue playing until one team declares it has put its cards in the right order. If they're correct, they win.

Scoring: The first team to put its cards in the correct order wins.

Notes: An internet search for "technology timeline" will turn up plenty of milestones to put on the cards.

E.D.G.E.
Ideas

Explain how it is done—Tell them.

Demonstrate the steps—Show them.

Guide learners as they practice—Watch them do it.

Enable them to succeed on their own—Have them practice/teach it.

EXPLAIN

- Define technology and how new technology is developed.
- Discuss new technologies and the older technologies they replaced.
- Explain how technology affects society and how society affects technology.
- List some dangers involved with online technology.
- Discuss how distractions caused by smartphones can be a safety issue.

DEMONSTRATE

- Show how to identify spam and avoid risky websites.
- Show internet videos of technology advances.
- Demonstrate how GPS can be used to find a geocache.
- Do a show-and-tell that illustrates advancements in technology.

GUIDE

- Help Scouts develop strong online passwords.
- Guide members to earn the Cyber Chip for their age group.
- Guide members as they research high-tech camping gear.
- Facilitate discussions of appropriate uses of technology.
- Play a game that lets Scouts practice GPS usage.
- Provide guidance as Scouts build robots for a competition.

ENABLE

- Enable Scouts to use the internet safely.
- Empower Scouts to teach younger Scouts what they've learned.
- Prepare Scouts to make informed decisions on technology purchases, weighing costs and benefits of various options (including making do with what they have).

MAIN EVENT SUMMARIES

● ESSENTIAL	■ CHALLENGING	◆ ADVANCED
Day Activity	Day or Overnight Activity	Day or Overnight Activity
Tech field trip—Visit a technology company or the manufacturer of a technological product. Visit with company personnel to learn about the technology they create—and the technology they use to create their products or services.	Travel technology up close—Take a trip on a boat, bus, plane, or train. Before and during the journey, learn as much about the operation as you can by visiting the engine room, control cab, dispatch station, bridge, etc.	Robot tournament—Find a robot competition that interests your group. (This could be as simple as a Lego® Mindstorms® tournament or as complex as a BattleBots® melee.) Plan, design, and then build a robot to compete.

TECHNOLOGY
Meeting Plan: Transportation and Energy

Week 1 Date_____

ACTIVITY	DESCRIPTION	RUN BY	TIME*
Preopening 15 minutes before meeting	Watch a technology-related video that involves transportation or transportation technology.		6:45 p.m.
Opening Ceremony 10 minutes	Flag presentation Oath and Law Uniform inspection		7 p.m.
Group Instruction 10 minutes	Define technology as inventions that aid daily life. Discuss how technology affects society and how society affects technology. Explain how new technology tends to replace old technology, and brainstorm where technology could go in the future.		7:10 p.m.
Skills Instruction 40 minutes	Begin working on one of the following merit badges: —Automotive Maintenance, Aviation, Canoeing, Cycling, Drafting, Electricity, Energy, Farm Mechanics, Kayaking, Motorboating, Nuclear Science, Programming, Railroading, Small-Boat Sailing, Space Exploration, or Truck Transportation. **Note:** This is the list of merit badge options for the Scout Nova technology module Start Your Engines.		7:20 p.m.
	Design and build a working model vehicle (not from a kit). For guidance, see the Scout Nova module Start Your Engines and the Venturing Nova module Power Up.		
	• List energy sources currently used in transportation technology. • Discuss alternative sources of energy. • Discuss the pros and cons of using alternative energy.		
Breakout Groups 15 minutes	Continue project begun during the skills instruction portion or begin planning for participation in the main event.		8 p.m.
Game 10 minutes	Play Nitro Transport (described earlier).		8:15 p.m.
Closing 5 minutes	Announcements Leader's minute Closing		8:25 p.m.
Total 90 minutes of meeting		
After the Meeting 15 minutes	Leadership team reviews plans for the next meeting and for the main event.		

*All times are suggested.

TECHNOLOGY
Meeting Plan: Cyber Chip and GPS

Week 2 Date_____

ACTIVITY	DESCRIPTION	RUN BY	TIME*
Preopening 15 minutes before meeting	Have early arrivers review the Cyber Chip requirements for their age group. See www.scouting.org/training/youth-protection/cyber-chip for details. Review each Scout's Cyber Chip status.		6:45 p.m.
Opening Ceremony 10 minutes	Flag presentation Oath and Law		7 p.m.
Group Instruction 20 minutes	• Review how the Scout Law relates to cybersafety and cyberbullying. • Watch one or more videos from the NetSmartz® Workshop (www.netsmartz.org/scouting) website about staying safe online.		7:10 p.m.
Skills Instruction 30 minutes	⬤ • With a GPS receiver for each participant, do the following: —Learn about global positioning satellites —Understand how latitude and longitude are represented in GPS devices —Explore the basic functions of the GPS receiver —Compare GPS usage to the usage of map and compass **Note:** Ideally, all GPS receivers should be the same model. If a variety of receivers is used, the instructor needs to be familiar with each model.		7:30 p.m.
	■ • Review the above information. • Learn how to program a route using multiple waypoints into a GPS receiver.		
	◆ • Review the above information. • Learn the science behind personal locator beacons. • Discuss the difference between latitude and longitude and the Universal Transverse Mercator (UTM) coordinate system. Discuss when each system is preferable. • Convert latitude and longitude coordinates into UTM coordinates.		
Breakout Groups 15 minutes	• Continue planning for participation in the main event. • Work on individual advancement and/or Scout skills as needed.		8 p.m.
Game 10 minutes	Play Find What They Hid (described earlier).		8:15 p.m.
Closing 5 minutes	Announcements Leader's minute Closing		8:25 p.m.
Total 90 minutes of meeting			
After the Meeting 15 minutes	Leadership team reviews plans for the next meeting and for the main event.		

*All times are suggested.

TECHNOLOGY
Meeting Plan: Smartphones

Week 3 Date_____

ACTIVITY	DESCRIPTION	RUN BY	TIME*
Preopening 15 minutes before meeting	As Scouts arrive, work with them to develop strong but memorable passwords they can use online. A good technique is to take a memorable sentence and convert it into a password. For example, *I had a blast at the 2017 National Scout Jamboree!* becomes Ihab@t2017NSJ!.		6:45 p.m.
Opening Ceremony 10 minutes	Flag presentation Oath and Law Uniform inspection		7 p.m.
Group Instruction 10 minutes	• Discuss the evolution of long-distance communication, including smoke signals, semaphore, telegraph, telephone, cellphone, and smartphone. • Discuss the safety risks of using smartphones (such as texting while driving or walking).		7:10 p.m.
Skills Instruction 40 minutes	• Explore the evolution of the telephone. • If possible, show examples or pictures of the following devices: hand-crank telephone (using a switchboard), dial telephone, push-button phone, cordless phone, original cellphone ("brick phone"), flip phone, and smartphone.		7:20 p.m.
	• Using a smartphone, demonstrate the basic functions of: —making a phone call —setting a calendar date —sending a text —finding an address —checking the weather • Share your favorite apps within the group. **Note:** Depending on the experience of the group, you may want to cover more advanced functions.		
	• Learn what it takes to develop an app, including how apps are coded and uploaded to an app store. • Brainstorm ideas of an app that would be useful to your group.		
Breakout Groups 15 minutes	• Continue planning for participation in the main event. • Work on Scout skills as appropriate.		8 p.m.
Game 10 minutes	Play Photo Scavenger Hunt (described earlier).		8:15 p.m.
Closing 5 minutes	Announcements Leader's minute Closing		8:25 p.m.
Total 90 minutes of meeting			
After the Meeting 15 minutes	Leadership team reviews plans for the next meeting and for the main event.		

*All times are suggested.

TECHNOLOGY
Meeting Plan: High-tech Camping

Week 4 Date_____

ACTIVITY	DESCRIPTION	RUN BY	TIME*
Preopening 15 minutes before meeting	Invite early arrivers to read the "Ask the Gear Guy" column from *Boys' Life* magazine to learn more about technological advances in outdoor gear.		6:45 p.m.
Opening Ceremony 10 minutes	Flag presentation Oath and Law		7 p.m.
Group Instruction 10 minutes	• Have someone who has been camping for decades discuss how camping technology has evolved since he or she started camping. • If possible, share information from an early Boy Scout handbook, such as a reprint of the 1911 *Handbook for Boys*, to demonstrate the technology early Scouts used.		7:10 p.m.
Skills Instruction 40 minutes	• Use outdoor magazines, catalogs, and websites to research the technologies used in the Scout Basic Essentials and other basic camping gear. • Discuss when it's appropriate to pay more for higher-tech gear.		7:20 p.m.
	• Learn about the technology involved in camp stoves and camp lanterns. • Discuss the safety features required for gear that uses flammable materials. • Discuss when it's appropriate to pay more for higher-tech gear.		
	• Use outdoor magazines, catalogs, and websites to find the ultimate high-tech camping gear, such as extremely light sleeping bags or camp stoves with USB ports. • See who can come up with the most amazing (or ridiculous) application of technology for camping. • Discuss when it's appropriate to pay more for higher-tech gear.		
Breakout Groups 15 minutes	Finalize plans for participation in the main event.		8 p.m.
Game 10 minutes	Play Tech Timeline (described earlier).		8:15 p.m.
Closing 5 minutes	Announcements Leader's minute Closing		8:25 p.m.
Total 90 minutes of meeting			
After the Meeting 15 minutes	Leadership team reviews plans for the next meeting and for the main event.		

*All times are suggested.

TECHNOLOGY
Main Event: Tech Field Trip

Date_____

Logistics

Location: _____
_____

Departure time: _____

Return time: _____

Duration of activity: 4 to 6 hours

Budget: Completed _____ Approved _____

Camping: Duty roster_____ Menu _____

Transportation: Group _____ Self_____

Essential (Tier I)

Visit a technology company or the manufacturer of a technological product. Visit with company personnel to learn about the technology they create—and the technology they use to create their products or services.

Equipment List	• Appropriate clothing • Lunch (group or individual) • Camera • Thank-you notes
Activity	• Identify a local technology company or manufacturer. • Make contact with the organization to set up a visit. • Gather for transportation to facility. • Take a tour and allow time for questions from the group. • Have lunch, as appropriate. • Return home. • Write thank-you notes.
Safety	• Follow your host's safety instructions for factory and lab tours. • Use the buddy system. • Two-deep adult leadership is required for all activities.

Notes

TECHNOLOGY
Main Event: Travel Technology Up Close

Date_____

Logistics

Location: _____

_____

Departure time: _____

Return time: _____

Duration of activity: 4+ hours (potential overnight if out of town)

Budget: Completed _____ Approved _____

Camping: Duty roster_____ Menu _____

Transportation: Group _____ Self_____

Challenging (Tier II)

Take a trip on a boat, bus, plane, or train. Before and during the journey, learn as much about the operation as you can by visiting the engine room, control cab, dispatch station, bridge, etc.

Equipment List	• Waivers and releases from transportation company • BSA flying plan and consent forms if taking orientation flights • Proper clothing • Scout Basic Essentials (Review the list and take what you need.) • Food • Overnight gear as appropriate
Activity	• Identify opportunities to travel on a boat, bus, plane, or train in your area. • Contact the operator to arrange for transportation and a tour, and thank the operator at the end of the tour. • Travel to the departure point. • Camp overnight in the area as appropriate. • Learn about transportation technology.
Safety	• Always follow the directions of the hosts to avoid incidents. • Use the buddy system. • Two-deep adult leadership is required for all activities.

Notes

Date_____

Logistics

Location: _____

_____

Departure time: _____

Return time: _____

Duration of activity: 4+ hours (potential overnight if out of town)

Budget: Completed _____ Approved _____

Camping: Duty roster _____ Menu _____

Transportation: Group _____ Self _____

◆ Advanced (Tier III)

Find a robot competition that interests your group. (This could be as simple as a Lego® Mindstorms® tournament or as complex as a BattleBots® melee.) Plan, design, and then build a robot to compete.

Equipment List	• List of upcoming robot tournaments • Official rules and entry form • Parts to build the robot of your design • Tools for assembly • Food and snacks for during competition • Camping/overnight gear, as appropriate
Activity	• Find a robot tournament that interests the unit. • Become familiar with the rules and objectives for the competition. • Submit an entry form before the deadline. • Build the robot per competition guidelines. Make sure each member of the unit has the opportunity to contribute. • Travel as necessary. • Compete in the tournament. • Do repairs as required. • Write a closeout report.
Safety	• Be aware that many robot accidents occur during nonroutine operating conditions, such as programming, maintenance, testing, setup, or adjustment. During these operations the operator may temporarily be within the robot's working envelope where unintended operations could result in injuries. • Use the buddy system. • Two-deep adult leadership is required for all activities.

Notes

This main event is classified as advanced due to the funding, resources, and costs of transportation required to prepare for and participate in the tournament.

RESOURCES AND REFERENCES

Books

Robotics merit badge pamphlet

Cook, David. *Robot Building for Beginners*. Apress, 2002.

Erlbach, Arlene. *The Kids' Invention Book*. Lerner Publishing Group, 1999.

Macaulay, David. *The New Way Things Work*. HMH Books for Young Readers, 1998.

Valk, Laurens. *The LEGO® Mindstorms® NXT 2.0 Discovery Book: A Beginner's Guide to Building and Programming Robots*. No Starch Press, 2010.

Voltz, Stephen, and Fritz Grobe. *How to Build a Hovercraft: Air Cannons, Magnet Motors, and 25 Other Amazing DIY Science Projects*. Chronicle Books, 2013.

Websites

Appalachian Mountain Club
GPS Basics
Website: www.outdoors.org/articles/amc-outdoors/gps-basics-what-is-a-waypoint

Compass vs. GPS
Website: outdoor-gear-deals.com/how-to-articles/compass-vs-gps/

List of Robot Competitions
Website: https://en.wikipedia.org/wiki/Robot_competition

RoboGames
Website: www.robogames.net

Robotics Education and Competition Foundation
Website: www.robotevents.com

Smartphones
Website: https://gizmodo.com/5870601/every-thing-you-need-to-master-your-new-smartphone

Related Program Features

Engineering, Geocaching, Mathematics, Multimedia, Project Planning, Science

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