

Supernova Mentor Training



Mentor's Guide



Prepared. For Life.®

Introduction

This guide is intended to provide Supernova mentors with the basic information they need to conduct successful Supernova mentoring sessions and projects.

Mentors who complete this training and Youth Protection Training are considered “trained” as Nova mentors by the BSA. When the training is complete, the training code D82 can be entered into the leader’s training record.

Before you begin to work with Scouts you must:

- Complete and submit a Boy Scouts of America *Adult Application*
- Be approved as a mentor by the council or district advancement committee
- Complete BSA Youth Protection Training

More information on these steps is included in this booklet.

Learning Objectives

At the end of this course, you will be able to:

- Understand the youth protection policies of the Boy Scouts of America.
 - Be familiar with the history, structure, and ideals of the Boy Scouts of America.
 - Know a mentor’s duties and responsibilities to the Boy Scouts of America and the Scout.
 - Understand and complete the requirements to be a registered SuperNova mentor with the Boy Scouts of America.
 - List some methods of mentoring and coaching.
 - Successfully guide a Scout through the SuperNova process.
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Chapter 1 – Introduction

Thank you for volunteering to be a Supernova Mentor in one or more of the Boy Scouts of America's program phases: Cub Scouting, Boy Scouting, Varsity Scouting, Sea Scouts, and/or Venturing!

Your service to the youth of America will make a significant difference in the lives of the youth whom you are preparing to serve.

This training guide will provide training and a reference to guide your activities as a Supernova Mentor.

The guide will begin with a brief introduction to the Scouting program to help you understand the history and purpose of Scouting.

Second, protecting America's youth is of foremost importance in Scouting so there is a brief section describing the Youth Protection Training and the broader program designed to protect the youth.

There is then a discussion of the Nova and Supernova awards program, followed by a section that is specific to mentoring.

Mentors

Adult leadership in Scouting is provided almost entirely by volunteers. Those volunteers come from all walks of life. They must agree to a criminal background check, agree to abide by the principles of Scouting, and complete Youth Protection Training.

Supernova Mentors must be educated, skilled, or employed in a science, technology, engineering, or mathematics (STEM) field. Youth need your understanding of science and mathematics to lead them through the Supernova awards and to provide them guidance and perspective on STEM careers.

For some youth, you will provide all of the mentoring required, but for some Supernova topics, you will help the youth to find other STEM professionals to provide information and suggestions about the parts that are outside of your knowledge base. The youth's success will be largely tied to your mentoring.

We understand you are knowledgeable about STEM, but we also need to educate you to the context of STEM in Scouting as you begin mentoring relationships with Scouts of various ages. The sections to follow will provide you with brief information about the history, mission, vision, program, community partnerships, and more.

An adult awards program is being planned that will reward your efforts. Those awards will likely be based upon the number of youth mentored, the number of those who achieve their Supernova goals, and some measure of the time required to achieve the Supernova. The time required for a youth to achieve their goals should be neither too fast, which implies the projects were not challenging enough, nor too long, which implies the project was too difficult or the youth was not motivated enough. While we all like to receive recognition for our work, the rewards you will receive when you observe the youth learning and maturing because of your mentoring will far exceed any awards bestowed by the Boy Scouts of America.

Chapter 2 - Scouting

Introduction

This section will introduce you to Scouting by providing a very brief history, a few facts, and some of the structure of the Boy Scouts of America. If you are a seasoned Scouter, this section is an excellent opportunity for a review of the history and impact of Scouting. For those new to Scouting, this brief overview will help you to understand the program and your role as a Mentor.

Like most large organizations, Scouting has its own jargon and acronyms. This introduction will help you to become familiar with the language Scouters use.

Scouting is any activity in which Scouts and Scouters participate. Scouts are the youth in the program, and Scouters are the adults who help to direct the youth. So as a new Scouter, welcome to Scouting, thank you for volunteering to help America's youth to become a successful citizen, and please read on!

A Brief History of the Origins of Scouting

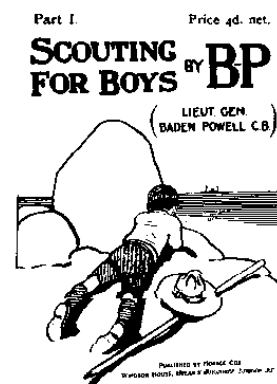
In 1899 Robert Baden-Powell, while serving in South Africa during the Boer War, penned a military training manual called *Aids to Scouting*. The book became a best-seller in England among boys and educators. Discovering this on his return to England decided to write a non-military version of scouting, outdoor, and leadership skills aimed at boys. He tested the ideas with 20 boys during a camp held at Brownsea Island in 1907. This is considered the beginning of the world-wide Scouting Movement.

His series of pamphlets, and then the book *Scouting for Boys*, using what he learned at Brownsea and ideas from American naturalist Ernest Thompson Seton's *The Birch Bark Roll of the Woodcraft Indians*, spread the concepts of Scouting throughout the British Isles, and soon after the world. The first troops of B-P's Scouts appeared in the United States as early as 1908.

It is told that in 1909 on a foggy street in London, American newspaper owner William Dickson "WD" Boyce was having difficulty finding his way. A young man offered to help him. The boy took Boyce to his destination and then refused to take any money for his trouble, saying he was a Scout and was doing a "good turn." His interest piqued, Boyce went to the Scout headquarters where he met with Baden-Powell and picked up reading material, including *Scouting for Boys*.

After returning to America, Boyce made plans with other men and incorporated the Boy Scouts of America on February 8, 1910. Soon thereafter, Seton's Woodcraft Indians, and Daniel Carter Beard's Sons of Daniel Boone, both joined the BSA and brought their youth groups into the program. Many other Scout associations that had sprung up in America joined the BSA as well.

In 1911, Dr. James Edward West, an attorney advocate of children's rights, was hired as the first professional Executive Secretary. Shortly thereafter, West's position was renamed the Chief



Scout Executive of the Boy Scouts of America. Along with other Scouting leaders West lobbied Congress seeking a congressional charter.

President Woodrow Wilson awarded and signed the charter in 1916:

That the purpose of this corporation shall be to promote, through organization and cooperation with other agencies, the ability of boys to do things for themselves and others, to train them in Scoutcraft, and to teach them patriotism, courage, self-reliance, and kindred virtues, using the methods which are now in common use by Boy Scouts.

This charter gave the rights to the symbols and the word “Scout” when referring to a boys’ Scouting program to the BSA and made the BSA a national organization.

Our founders, most notably Seton and Baden-Powell, understood over 100 years ago that an understanding how of scientific concepts impacted their lives, the world, and the universe was important to the development of young men. They wove the concepts throughout the program.

Among the original 57 merit badges introduced in 1911 there were many we would include as STEM merit badges today. These included Architecture, Astronomy, Aviation, Chemistry, Electricity, Machinery, and Surveying.



From Aeronautics to Zoology, hundreds of merit badges over the last century have been STEM-related.

But it has not just been merit badges. If you were a Scout do you remember learning about the food chain, or how to measure the height of a tree using a stick, or how to find north by looking at the stars, or about the Earth’s magnetic field, or participating in Project SOAR? Or the hundreds of other things you learned as a Scout that brought Science, Technology, Engineering, and Math into your world in a practical way? “Incorporating technology and engineering into regular curriculum by creating a ‘meta-discipline.’”



Since 1910 Scouting has created interest in STEM careers and has prepared Scouts to go on to greater things in life. Have you ever heard of Paul Siple? He was an Eagle Scout who accompanied Admiral Byrd to Antarctica as part of a BSA program in 1928. He went on to become an expert on Antarctica, designed cold weather gear for soldiers in Korea, and is credited with the development of the wind chill scale. Five geographic features in Antarctica are named for him. How about Eagle Scout Neil Armstrong? Thousands of Scouts have gone on to excel in STEM fields after being exposed to them in the Scouting program.

In 2010, the BSA started to pilot a STEM-based awards program that was made possible by a generous grant from the Exxon-Mobil Corporation. After successful pilots, the program was released nationwide in the summer of 2012 and has been received with a great deal of enthusiasm with many youth now actively pursuing the awards.

Foundations of the Boy Scouts of America

The BSA is guided by the Mission Statement, the Scout Oath, the Scout Law, and the Vision Statement. The National Executive Board of the BSA uses these to set the course for the programs of the BSA.

Mission Statement: *The mission of the Boy Scouts of America is to prepare young people to make ethical and moral choices over their lifetimes by instilling in them the values of the Scout Oath and Law.*

Scout Oath

*On my honor I will do my best
To do my duty to God and my country
and to obey the Scout Law;
To help other people at all times;
To keep myself physically strong,
mentally awake, and morally straight.*

Scout Law

A Scout is:

<i>Trustworthy</i>	<i>Obedient</i>
<i>Loyal</i>	<i>Cheerful</i>
<i>Helpful</i>	<i>Thrifty</i>
<i>Friendly</i>	<i>Brave</i>
<i>Courteous</i>	<i>Clean</i>
<i>Kind</i>	<i>Reverent</i>

Vision Statement: *The Boy Scouts of America will prepare every eligible youth in America to become a responsible, participating citizen and leader who is guided by the Scout Oath and Law.*

Declaration of Religious Principles

Members of the BSA agree to respect the declaration of religious principles:

The Boy Scouts of America maintains that no member can grow into the best kind of citizen without recognizing an obligation to God and, therefore, recognizes the religious element in the training of the member, but it is absolutely nonsectarian in its attitude toward that religious training. Its policy is that the home and organization or group with which a member is connected shall give definite attention to religious life. Only persons willing to subscribe to this Declaration of Religious Principle and to the Bylaws of the Boy Scouts of America shall be entitled to certificates of membership.

The BSA does not define God so many religious faiths are found in Scouting.

Phases of the Scouting Program

There are multiple age-based phases of the traditional Scouting program.

Cub Scouting



Cub Scouting is a home and neighborhood program for boys in the first through fifth grades, or 7 to 10 years of age. Cub Scouts are organized into small groups, usually of boys who are in the same grade or are the same age, called *dens*. Dens are led by parent volunteers called *den leaders*. Several dens are organized into a larger unit called a *pack* led by a volunteer called a *Cubmaster*. Dens typically have weekly meetings while the packs will often have monthly meetings.

Advancement and activities are age-specific and are based on the concept of “creative play” and life and family skills. Ranks in Cub Scouting are not progressive – they are grade and/or age based. All Cub Scouts earn the Bobcat rank to learn the ideals of Cub Scouting. First-graders earn Tiger; second-graders Wolf, third-graders Bear; fourth-graders Webelos (WE’LL BE Loyal Scouts); and fifth-graders Arrow of Light.

The highest rank in Cub Scouting is the *Arrow of Light* award and its requirements relate to basic Boy Scouting skills.

Boy Scouting

Boy Scouts are boys who are 11-17 years old. Boys earn progressive ranks from Tenderfoot to Eagle - Scouting’s highest rank. The program is built around the patrol method (small group learning), leadership development, and outdoor activities. Boys are organized into *patrols* of 6-8 Scouts led by an elected patrol leader. One or more patrols makes up a Boy Scout *troop*. Troops are also led by the boys, who elect a *senior patrol leader* and other leadership positions such as scribe, quartermaster, historian, webmaster, and others. These Scouts lead the troop with close consultation with the *Scoutmaster* and assistant Scoutmasters. The boys organize and conduct meetings, outings, the yearly calendar, and help to plan and conduct ceremonies.



Boy Scouts learn to become able, confident, and productive citizens. The ranks the boys can earn build upon these traits, with the rank of *Eagle* being well known in society as the highest rank that can be earned. Only about five percent of boys who begin as a Boy Scout will earn the rank of Eagle. Many of the country’s most accomplished men are Eagle Scouts (one is always an Eagle Scout, so the term “former” is not appropriate).

Venturing



Venturing is a co-ed program for youth 14 years of age, or 13 years of age and completion of the eighth grade, through 20 years of age. Venturing units are organized as a *crew* which has an adult *advisor* and associate advisors to provide advice but not to lead the crew. The youth elect officers who lead the crew with the adults providing guidance only as needed. The crew has a *president* and other officers. Venturing crews determine the focus of their activities, so there are crews that focus on such varied things as high adventure, culinary arts, theatre, and STEM.

Sea Scouts, the oldest Scouting program for older youth, has a boating emphasis and is related to Venturing.

Varsity Scouting is another phase of the Scouting program for teen-aged youth and has a sports emphasis. Varsity Scouting is not co-ed.

Chartered Organizations

Packs, troops, teams, ships, and crews are chartered by the BSA to a community organization we call a *chartered organization*. Chartered organizations are civic, faith-based, and educational organizations that operate Scouting units to deliver the programs to their youth members, as well as the community at large. The chartered organization agrees to provide a meeting place, to select the adult leadership, and to support the unit. The chartered organization appoints a *Chartered organization representative* who is a liaison between the unit and the chartered organization, and between the chartered organization and the BSA local council.

Organization of the BSA

The Boy Scouts of America has about 290 local councils covering the United States, its territories, and overseas military bases. Local councils are chartered by the National Council, headquartered in Irving, Texas, to serve the chartered organizations and carry out the BSA's program in an assigned geographical area. The National Council is divided into four administrative regions, which are in turn divided into areas, to facilitate communication, training, and support.

The BSA is led at all levels by volunteers, with career professional Scouter support.

A local council is led by a volunteer *council president* and a volunteer *executive board* elected annually by the chartered organization representatives and elected council members at large. The board employs a professional Scouter called a *Scout executive* to administer the council.

Depending on the size of the local council the board may organize *districts* to carry out the council program in a geographical area of the council. The district committee consists of elected and appointed volunteers who may work with a professional *district executive* selected by the Scout executive.

In addition to the Scout executive and district executives, there are often other professional Scouters in the council who work with volunteer committees to develop the council program activities, manage the council's summer camp, organize new units, and recruit new members.

Chapter 3 - The Youth Protection Program in the BSA

The Boy Scouts of America places the greatest importance on creating the most secure environment possible for our youth members. To maintain such an environment, the BSA developed numerous procedural and leadership selection policies and provides parents and leaders with resources for the Scouting program.



Leadership Selection

The Boy Scouts of America takes great pride in the quality of our adult leadership. Being a leader in the BSA is a privilege, not a right. The quality of the program and the safety of our youth members call for high-quality adult leaders. We work closely with our chartered organizations to help recruit the best possible leaders for their units.

The adult application requests background information that should be checked by the unit committee or the chartered organization before accepting an applicant for unit leadership. While no current screening techniques exist that can identify every potential child molester, we can reduce the risk of accepting a child molester by learning all we can about an applicant for a leadership position — his or her experience with children, why he or she wants to be a Scout leader, and what discipline techniques he or she would use.

Required Training

Youth Protection training is required for all BSA registered volunteers.

Youth Protection training must be taken every two years. If a volunteer's Youth Protection training record is not current at the time of re-charter, the volunteer will not be re-registered.

Youth Protection Reporting Procedures for Volunteers

There are two types of Youth Protection-related reporting procedures all volunteers must follow: When you witness or suspect any child has been abused or neglected – See "Mandatory Report of Child Abuse" below.

When you witness a violation of the BSA's Youth Protection policies – See "Reporting Violations of BSA Youth Protection Policies" below.

Mandatory Report of Child Abuse

All persons involved in Scouting shall report to local authorities any good-faith suspicion or belief that any child is or has been physically or sexually abused, physically or emotionally neglected, exposed to any form of violence or threat, exposed to any form of sexual exploitation, including the possession, manufacture, or distribution of child pornography, online solicitation, enticement, or showing of obscene material. You may not abdicate this reporting responsibility to any other person.

Steps to Reporting Child Abuse

- Ensure the child is in a safe environment.

- In cases of child abuse or medical emergencies, call 911 immediately. In addition, if the suspected abuse is in the Scout's home or family, you are required to contact the local child abuse hotline.
- Notify the Scout executive or his/her designee.

Reporting Violations of BSA Youth Protection Policies

If you think any of the BSA's Youth Protection policies have been violated, including those described within Scouting's Barriers to Abuse, you must notify your local council Scout executive or his/her designee so appropriate action can be taken for the safety of our Scouts.

Scouting's Barriers to Abuse

The BSA has adopted the following policies to provide additional security for our members. These policies are primarily for the protection of our youth members; however, they also serve to protect our adult leaders from false accusations of abuse.

Two-deep leadership is required on all outings. Two registered adult leaders or one registered leader and a parent of a participant, or other adult, one of whom must be 21 years of age or older, are required on all trips and outings. The chartered organization is responsible for ensuring sufficient leadership is provided for all Scouting activities. There are a few instances, such as patrol activities, when the presence of adult leaders is not required and adult leadership may be limited to training and guidance of the patrol leadership. With the proper training, guidance, and approval by the troop leaders, the patrol can conduct day hikes and service projects. Appropriate adult leadership must be present for all overnight Scouting activities; coed overnight activities—even those including parent and child—require male and female adult leaders, both of whom must be 21 years of age or older, and one of whom must be a registered member of the BSA. The chartered organization is responsible for ensuring sufficient leadership is provided for all activities.

One-on-one contact between adults and Scouts is prohibited. In situations that require personal conferences, such as a Scoutmaster's conference, the meeting is to be conducted in view of other adults and youths.

Separate accommodations for adults and Scouts are required. When camping, no youth is permitted to sleep in the tent of an adult other than his or her own parent or guardian. Councils are strongly encouraged to have separate shower and latrine facilities for females. When separate facilities are not available, separate times for male and female use should be scheduled and posted for showers. Likewise, youth and adults must shower at different times.

Privacy of youth is respected. Adult leaders must respect the privacy of youth members in situations such as changing clothes and taking showers at camp, intruding only to the extent that health and safety require. Adults must protect their own privacy in similar situations.

Inappropriate use of cameras, imaging, and digital devices is prohibited. While most campers and leaders use cameras and other imaging devices responsibly, it has become very easy to invade the privacy of individuals. It is inappropriate to use any device capable of recording or transmitting visual images in shower houses, restrooms, or other areas where participants expect privacy.

No secret organizations. The Boy Scouts of America does not allow any secret organizations as part of its program. All aspects of the Scouting program are open to observation by parents and leaders.

No hazing. Physical hazing and initiations are prohibited and may not be included as part of any Scouting activity.

No bullying. Verbal, physical, and cyber bullying are prohibited in Scouting.

Adult leaders monitor youth leadership. Adult leaders must monitor and guide the leadership techniques used by youth leaders and ensure BSA policies are followed.

Discipline must be constructive. Discipline used in Scouting should be constructive and reflect Scouting's values. Corporal punishment is never permitted.

Appropriate attire for all activities. Proper clothing for activities is required. For example, skinny-dipping or revealing bathing suits are not appropriate as part of Scouting.

Members are responsible to act according to the Scout Oath and Scout Law. All members of the Boy Scouts of America are expected to conduct themselves in accordance with the principles set forth in the Scout Oath and Scout Law. Physical violence, theft, verbal insults, drugs, and alcohol have no place in the Scouting program and may result in the revocation of a Scout's membership.

Units are responsible to enforce Youth Protection policies. The head of the chartered organization or chartered organization representative and the local council must approve the registration of the unit's adult leader. Adult leaders of Scouting units are responsible for monitoring the behavior of youth members and interceding when necessary. Parents of members who misbehave should be informed and asked for assistance.

Any violations of the BSA's Youth Protection policies must immediately be reported to the Scout executive.

Digital Privacy

A key ingredient for a safe and healthy Scouting experience is the respect for privacy. Advances in technology are enabling new forms of social interaction that extend beyond the appropriate use of cameras or recording devices (see "[Scouting's Barriers to Abuse](#)"). Sending sexually explicit photographs or videos electronically or "sexting" by cell phones is a form of texting being practiced primarily by young adults and children as young as middle-school age. Sexting is neither safe, nor private, nor an approved form of communication and can lead to severe legal consequences for the sender and the receiver. Although most campers and leaders use digital devices responsibly, educating them about the appropriate use of cell phones and cameras would be a good safety and privacy measure.

The "Three R's" of Youth Protection

The "three R's" of Youth Protection convey a simple message for the personal awareness of our youth members:

Recognize situations that place you at risk of being molested, how child molesters operate, and that anyone could be a molester.

Resist unwanted and inappropriate attention. Resistance will stop most attempts at molestation.

Report attempted or actual molestation to a parent or other trusted adult. This prevents further abuse and helps to protect other children. Let the Scout know he or she will not be blamed for what occurred.

Key Youth Protection Resources

[State Statutes on Child Welfare](#) Reporting requirements for child abuse differ from state to state. The Child Welfare Information Gateway provides access to information and resources on a variety of topics, including state statutes on child abuse. This site is not operated by the Boy Scouts of America.

[Guide to Safe Scouting](#) The purpose of the *Guide to Safe Scouting* is to prepare adult leaders to conduct Scouting activities in a safe and prudent manner.

[It Happened to Me: Cub Scout Meeting Guide](#) Video Facilitator Guides. A sample letter to parents and guardians as well as English and Spanish meeting guides for facilitators' use when showing the age-appropriate sexual abuse prevention video.

[A Time to Tell: Troop Meeting Guide](#) Video Facilitator Guides; English and Spanish meeting guides for facilitators' use when showing the age-appropriate sexual abuse prevention video.

[Personal Safety Awareness Meeting Guide](#) (Venturing Program) Video Facilitator Guides. A sample letter to parents and guardians as well as English and Spanish meeting guides for facilitators' use when showing the age-appropriate sexual abuse prevention video.

[Youth Protection Training Facilitators Guide](#) Video Facilitator Guides

[Camp Leadership ... A Guide for Camp Staff and Unit Leaders](#) Brochure for unit leaders and camp staff who are responsible for providing a safe and healthy camp setting where Scouts are free from the worries of child abuse.

[Scouting's Barriers to Abuse](#) The purpose of *Scouting's Barriers to Abuse* is to inform adult leaders the measures that have been put in place in an effort to prevent abuse within the BSA.

Chapter 4 - The Nova and Supernova Awards

Due to the increasing difficulty and complexity seen in the Supernova awards mentors, not counselors, supervise these awards, and the mentor's roles and responsibilities are discussed in Chapter 5.

Supernova awards have been created for each of the Boy Scouts of America's main age groups.

The requirements for each are based on the ages served by its phase of the program and are increasingly challenging.

Cub Scouts - *Dr. Luis W. Alvarez Supernova Award*

Webelos Scout - *Dr. Charles H. Townes Supernova Award*

Boy Scouts - *Dr. Bernard Harris Supernova Award* and *Thomas Edison Supernova Award*

Venturers - *Dr. Sally Ride Supernova Award*, *Wright Brothers Supernova Award*, and *Dr. Albert Einstein Supernova Award*

Take some time now to visit the Supernova award [web site](#) and look over the award requirements to give you some specifics as to what is expected from the youth and to help inform you as to how you may best guide the youth through the process.



Chapter 5 - Mentoring

Requirement
Register annually (no fee, Counselors use position code 58, Mentors use position code 52, not a unit position)
Be at least 21 years old
Be of good character
Current Youth Protection trained
Be knowledgeable in the award subject by vocation, hobby, education
Able to work with Scouts-age youth
Submit SuperNova Mentor application
Be approved by district/council advancement committee

Nova Award Counselors and Supernova Award Mentors must register annually with the Boy Scouts of America. There is no fee to register. Counselors use position code 58, Mentors use position code 52.

They both must be at least 21 years of age, of good character, and have current Youth Protection Training. They both must be able to work well with Scout-age youth. Supernova Mentors must be knowledgeable in the award subject by their vocation, hobby, or education. Nova Counselors must be familiar with the subject and be able to research and discuss unfamiliar topics to help the Scout.

Mentors must submit an application and be approved by the district or council advancement committee. Counselors' applications can be approved by the unit.

Why Does the BSA use mentors? Because it meets one of the Methods of Scouting: Association with Quality Adults. Mentors provide a new contact with different adults and professionals in a field of interest for a Scout.

In the Supernova program, each youth has a mentor who guides the youth through each of the awards. The mentor will help the youth to decide upon research topics, help them to develop a project from the selected topic, help to identify and recruit the appropriate subject matter experts (if different from you as the mentor) to assist the youth in their project, and determine the difficulty and complexity of the project.

Additionally, as the youth's mentor, you will be the person to encourage them to complete all of the Supernova awards and to help them to work through the inevitable setbacks that will occur.

Overcoming unexpected problems is actually one of the challenges of STEM professions that make those careers fun and interesting. These aforementioned duties will be examined separately in some detail. The success of the youth in the Supernova program will be largely determined by your efforts to mentor them. You will discover that efforts will be greatly rewarded by the achievements of your charge.

Getting Started

Although you need to get acquainted with the youth(s) who you will be mentoring, you must first take the BSAs Youth Protection Training and if working with Venturers, you must also take the Venturing Youth Protection Training. You **MUST** observe BSA youth protection guidelines at all times. If you have not taken Youth Protection Training, you should do so before proceeding. (www.myscouting.org)

Should you have youth protection problems or dilemmas, please consult the staff at your local council office. Remember, Youth Protection is designed to protect youth as well as to protect adults from false accusations.

Since you are a STEM professional, you know better than most that science and mathematics underlie engineering that provides the ability to design and market new technology. Also, you will understand better than others science and mathematics are interesting and FUN! It is important to eliminate terms such as “hard” or “difficult” from your vocabulary when describing STEM. Replace those terms with “challenging.” This implies an obstacle that can be mastered. *Let them see your passion for your field.*

Program	Age and Experience	Group Structure	Learning Styles
Cub Scouts, Webelos	<ul style="list-style-type: none"> Boys 8 – 10 years old Grade 2 – 4 Little math or science contact 	<ul style="list-style-type: none"> Generally in Dens of 4 – 8 Scouts adult leader 	<ul style="list-style-type: none"> See and do Tactile and visual Structured Learning Open to everything – no preconceived notions
Boy Scouts,	<ul style="list-style-type: none"> Boys 11 – 18 years old Grade 5 – 12 Some math and science education 	<ul style="list-style-type: none"> Small groups of 2 to 8, with a buddy Youth leader 	<ul style="list-style-type: none"> See and do Tactile and visual Use EDGE teaching method Eager to explore new worlds Science may be seen as “too hard”
Varsity Scouts, Venturers	<ul style="list-style-type: none"> Young Men and /or Women 13 – 20 years old Grades 8+ 	<ul style="list-style-type: none"> Groups of 2* or more with a buddy Youth leader 	<ul style="list-style-type: none"> See and do Reflection, research, brainstorm Self-directed – Mentor is a team leader Emulate adult as role model Science and Math may be seen as “un-cool”

(EDGE – Explain, Demonstrate, Guide, Enable)

You need to get to know the youth who you are mentoring. Ask questions about their goals and aspirations. Now is not the time to critique them but a time to listen and learn. With time, you will help the youth realistically assess their abilities so they can compare and contrast with the skills required to fulfill their aspirations. Now is the time to listen and ask open-ended questions. Find out about their hobbies and pastime activities. Are they involved or interested in sports or games? What would be some examples of an ideal Saturday? In other words, get to know the youth who you are mentoring.

Once you know the youth and can assess their strengths and talents, you can help to guide them in career and educational choices. In doing so, do not tell them what to do but rather help them to determine it for themselves. For example, consider a rising high school junior who tells you they want to be a physicist. However, you know they have not performed well in mathematics to date and physics is a mathematically intense field (or perhaps you read about physics or consulted a colleague who is a physicist). While it is tempting and easier to just tell them it would be an unwise choice, it is important to lead them to an understanding. Being direct could make them defensive or feel like a failure. So talk to them about how physics requires mathematical prowess and how their performance has not been stellar. Let them decide if the best course of action is to change career aspirations or whether they will work harder on becoming proficient in mathematics. That empowers the youth to take control of their lives and helps them to understand how to assess the requirements for a career and how to assess their own talents.

In summary, mentors should first learn, understand, and practice youth protection at all times. You should get to know the youth who you are serving and determine their goals and abilities. In time, you should help them to understand how to self-assess their skills and abilities to determine the possible careers and direction of their lives. Throughout this process, the beauty and FUN of STEM will be consistently emphasized.

To highlight our discussion, here are some questions you may ask yourself how to get to know the youth(s) you are mentoring:

- What are their goals and aspirations?
- What are their hobbies?
- Are they interested in sports? Games?
- What would be their ideal Saturday?
- Finding the right subject matter expertise

It is highly likely that one or more youth you mentor in the Supernova program will select a research topic that is not only outside your area of expertise but well outside your field of knowledge. This does not mean you should not continue as the youth's mentor. It will add somewhat to your preparation for meeting and helping the youth(s) outside your area or field. In fact, you may find you are more effective when helping a youth outside your field than one in your area of specialization. So do not view this as a negative but rather as an opportunity to learn some new information while mentoring a youth. The two situations will be considered separately.

- ***The youth has selected a topic in your field but outside your area of expertise***

This case should be relatively straightforward to address. Since the topic is in your field, there is no reason why you should not provide the bulk of the guidance for the youth including direction of the research projects. You will likely know people in the particular area that the youth has chosen who can answer in particular questions. The subject matter expert will be speaking your scientific or technical language so lengthy or frequent meetings or conversations will not likely be required.

For these reasons, you should direct the youth's project and mentor the youth on how a subject matter expert can help to plan, execute, and analyze a project. Sometimes, you might need to call the subject matter expert for specific guidance. Other times, you might have the youth call or visit the subject matter expert with you listening to the interaction so you can then discuss how they can better communicate. Also, you can then clarify potential miscommunications to avoid later confusion. Since you will not know everything about the project, you can mentor the

youth in how to collect and utilize information from various sources including subject matter experts.

Remember, you must follow youth protection policies at all times. So you cannot allow the youth to meet the subject matter expert in a one-on-one encounter. If the subject matter expert is to have significant contact with the youth (more than a few encounters), then the subject matter expert will need Youth Protection Training as well. Do not put yourself or the youth you serve at risk by ignoring or skirting youth protection guidelines.

- ***The youth has selected a topic outside of your field***

This is a different situation. The youth could have selected a topic in microbiology and hopes to one day become a physician and your expertise is in nuclear physics. When faced with this dilemma, you must first assess your personal skills and interests. Then, you must determine the level of the project (how to determine the appropriate level is covered more fully in the next section). If the project is at a relatively elementary level, and you have some interest and/or talent for the area, then you can serve as the mentor for the project and approach it as above. This can be even more fun for you, and you can show first-hand how much fun discovering new science can be since you will be on the journey with the youth. It is extremely important to control your exuberance and not do the project for the youth. It is reasonable to find articles or other sources of information and to describe how that information relates to the project.

If you have no talent or interest in the youth's chosen project, then you must aid him or her in finding a suitable subject matter expert. It is recommended you actually find the appropriate expert and then have the youth contact them. This is because you will need to discuss with the potential SME the program, their role and responsibilities, expectations, and youth protection guidelines. It may be that you will need to try more than one person who is willing to fulfill this role. *You remain their mentor* but will have a subject matter expert directing more of the actual project. You will still determine the breadth of the project and assure that it is of an appropriate difficulty and complexity for the particular youth. You still will assist the youth in finding answers to questions and in being a role model. Your job will be to guide the youth through the entire project, encourage the youth when things are not going well, and provide upbeat, positive, constructive criticism.

When criticizing the youth, always start with a positive observation to praise them. Tell them clearly, but not harshly, the issue where they are not performing at the level expected for them and then end with an example on how to best address the problem. At no time should you ever yell or berate a youth. If the youth is about to make a mistake that could harm himself or others, take measures to prevent the incident from happening. If the only way to prevent the incident is yelling, then it is permissible. Only in situations that could reasonably result in great danger should you intervene physically.

Picking Research Topics

In working on Supernova research projects, the youth will be required to learn about a field and show some competence in that field. For example, to earn the highest award in the Supernova program, the Venturing Albert Einstein Award, the youth will have to complete five requirements, with the fourth requirement stating:

With guidance from your mentor, select an area of current STEM-related concern and develop a research project or experiment related to that area. This research project or experiment should be challenging and should require a significant investment of time and effort on your part. (A guideline would be approximately 100 hours.) If your mentor is not a specialist in the area of your project or experiment, he or she will solicit assistance from a specialist who may serve as a

STEM consultant. Execute the project or experiment. Prepare a complete and well-documented written report AND an oral presentation. Present both to your mentor and your local council Nova committee.

So the youth whom you are mentoring will need to select a topic. That selection process will prove to be crucial in the successful completion of this requirement. The steps you need to go through are these:

- **Ask the youth about areas in which they would like to do a project.** Be sure to generalize those topics. If the youth picks a narrow area of biology, take note of that and suggest a broader, related topic.
- **Understand the reasons the youth wants to do that topic.** Listen and note them, but be firm that the youth must list some topics in diverse areas. Do not be judgmental, but try to understand their thoughts.
- **Insist they also list other topics in other fields.** After the list is generated, review it with them and get an approximate order of interest. (At this point, you will likely need to contact some STEM professionals to understand what is actually possible in your geographic area. Make notes on the possibilities for several of the topics developed with the youth.)
- **Meet again with the youth and discuss what you have found.**

In process of choosing the actual topic, you as the mentor will need to play a large role in the selection of the topic based on all considerations such as how convenient the laboratory is in which to do the experiments, how interested you believe the subject matter expert is in making the project possible (does not apply if it is your lab), and how motivated the youth will be for the particular project. In other words, you need to take a major role in this selection process

Do not pick the topic but help the youth to understand your reasons for picking a particular topic. Have a meeting with the scientist whose lab will be used or, if your lab is to be used, continue the discussion with the youth.

If the youth and the subject matter expert (or you) cannot come up with an exciting project that is challenging (see “Determining the difficulty and complexity of the project” below), then politely suggest another avenue might be better suited. If the arrangement will not work in your judgment, don’t go forward. Everyone will be happier than to have an unsuccessful project. Have the youth recount the importance, goals, methods, and data evaluation of the research that has been selected. Correct any misconceptions and once again have them recount the same points. Repeat this until, in your judgment, the youth understands the experiment. After completing the above process, the youth should have a topic selected, the significance of the project delineated, co-investigators identified, and the scientific methods to be used understood by all. You have the subject matter expert (yourself or someone else), an experiment, and the place in which the experiment will be conducted. So now arrange the experiment times and start your project after considering the safety issues (see ‘Safety’ below).

Determining the Difficulty and Complexity of the Project

It is important to help your youth to select a project that is challenging without being too difficult. That line might have to be adjusted as the project proceeds by adding or subtracting portions of the project. It is ideal to consider this in the planning stage, but it often will not be apparent at what level the youth should be performing prior to starting the work.

Generally in Scouting, one is not to add or subtract from requirements, and this effort is the same. However, part of the reason for the youth to have you to mentor them is to be certain the project is challenging.

“Challenging” can be defined as an experiment that tests the ability of the youth and is stimulating, thought provoking, and interesting. Youth have different skills, strengths, and abilities. It is your job to work with the subject matter expert to be certain the experiment is providing a challenge while not being discouraging because it is too hard. Given the exact same experiment, one youth could find it too difficult to complete and another would find it trivial (be careful to distinguish between too difficult and the youth not wanting to do all of the work).

The goal would be to provide the help and/or alter the experiment to better match the abilities of the youth finding it too difficult. The youth not being challenged should have tasks added to provide the challenge. Even though one youth will have done more than the other, both would pass upon successful completion of the project.

The role of the mentor is to help the youth to be successful. It is not to make roadblocks that make it difficult to earn the Supernova awards. In the circumstance that a youth is struggling, it is the duty of the mentor to help the youth to complete the Supernova awards. This might take extra meetings and discussions. You will need to understand the problems the youth is facing. It could be the youth is overwhelmed with obligations and all is needed is a change in the timeline for completing the experiments. It could be a different topic would yield a better result, or it could be the task is simply too difficult.

Since this program is to help youth to decide about careers in STEM, we need to understand some will decide STEM careers are not what they are best suited to do. That is a successful result, just as the youth who becomes a world-renowned scientist.

Youth may also decide they like one part of STEM better than others – for example, if you are a basic researcher, having the youth decide they want a career in technology may seem like a failure, but achieving understanding early in life is a success. A youth who is capable in some parts of STEM but not all can avoid potential academic problems by determining they should do a part of STEM they had not originally considered. For example, a youth may be planning to become an engineer but is weak in mathematics. These experiences could allow the youth to pick another part of the STEM spectrum that requires less mathematical ability.

So challenge the youth, don't make it too difficult, and point out the FUN in learning new things.

Safety


One of your jobs as a mentor is to be certain safety standards are followed in all experiments and laboratory settings. In general, the Occupational Health and Safety Act (OSHA) standards and your state's equivalent standards should be followed. The institution where the laboratory or experiment is being performed will also have safety standards that should be observed. Finally, particular instruments may have particular safety standards. For example, lasers are governed by OSHA regulations that refer to American National Standards Institute (ANSI) standards. ANSI standards for lasers often require a laser safety officer (LSO) who certifies the laser setup and defines the safety requirements such as laser safe glasses, laser enclosures, and other protective measures that must be used.

Some other safety organizations include Institute of Electrical and Electronics Engineers (IEEE), American Society for Testing and Materials (ASTM), Society of Automotive Engineers (SAE), International Organization for Standardization (ISO), and American Society of Mechanical Engineers (ASME) that all produce safety standards for particular instruments, devices, chemicals, etc.

It is not expected that mentors become safety experts in all areas. That is not a reasonable request and would take most scientists far afield from their areas of expertise. So what is

expected? First, your role whenever in a laboratory or doing an experiment is to be conscious of potential safety issues. There are two possible situations to consider:

- ***If you are leading the experiment or showing the laboratory***, then safety is your responsibility. You are expected to review the pertinent safety standards and know how to properly execute them. If needed, you should consult with safety experts for clarification of any portion of the safety measures that will need to be taken. Be sure there is enough personal protective equipment (PPE) for all of the youth (you may be mentoring more than one youth at a time) and adults attending. Examine the safety equipment in advance if possible. **Do not allow youth to participate or view without needed safety equipment or with defective safety equipment.**
- ***If someone other you is leading the experiment or showing the laboratory***, then your role is to be certain the person leading is following safety rules. The best way to be certain is to ask questions of the person in advance. Questions such as what are the dangers, what standards apply, and what protective measures should be followed (PPE, for example). Also, be sure to ask about any age restrictions or other restrictions that could apply to your youth. An example might be if you have girls of reproductive ages and are planning on doing chemistry experiments where some of the chemicals are dangerous in pregnancy, then there could be reason to take extra precautions (remember, the public may not know Venturing is coed). If you are not satisfied the host is going to be committed to the safety of your youth, then do not go. Since you are not leading the activity, be vigilant for safety concerns by observing what your youth are doing more than what the host is talking about. Once again, be sure there is enough personal protective equipment (PPE) for all of the youth and adults attending. Examine the safety equipment in advance if possible. **Do not allow youth to participate or view without needed safety equipment or with defective safety equipment.**

Situation	Risk	Mitigation
Scouts research topics on the Internet	<ul style="list-style-type: none"> • Contact with inappropriate content • Susceptible to Cyber Bullying 	
Scouts in contact with adults not known to them	<ul style="list-style-type: none"> • Inappropriate contact • Allegations of inappropriate contact 	<ul style="list-style-type: none"> • Youth Protection training and policies • Youth follow Buddy System
Different levels of education or understanding of material	<ul style="list-style-type: none"> • Missed program opportunities • Disrespect from/to peers • Bullying 	<ul style="list-style-type: none"> • Adjust teaching techniques to abilities and preparation level of Scouts • Maintain group discipline • “No Cheap Shots” policy
STEM activities contain hazards	<ul style="list-style-type: none"> • Injury • Property damage 	<ul style="list-style-type: none"> • Use safety gear and practices • Maintain control of activities

This should not be viewed as a daunting or burdensome requirement. The idea is to be conscientious and prudent to be certain all required and reasonable safety measures are

observed. Ask questions so you are comfortable with the safety for your youth. One important principle is if you **ever** feel a situation is becoming dangerous, then immediately remove your youth from the situation. Seeing a novel demonstration or experiment will never compensate a serious injury. **So stay safe.**

You are an Important Role Model

The youth you mentor will look to you as a role model. That means that not only will they model their behavior after your example, but also they will decide if they want a STEM career based partly upon the experiences with you. These are important duties and another reason why mentors such as you are required to be STEM professionals.

Even though the youth may not appear to be watching you, they will be doing so. They will tend to pick up the more negative things you do (just human nature), so set a good example. Portray the ideals for a STEM professional though it is important to be realistic as well. Many STEM professionals must deal with a lot of paperwork. It is not unreasonable to say paperwork detracts some from the joy of your job, but that it is something that must be done. Explain why the organization wants the paperwork and portray it in a non-emotional way. For example, "We have to fill out regular safety forms so that in the event of an accident, the organization can show safety procedures were known and being followed." Such information provides some legal protection for the company and for any regulatory inspections. Be on your good behavior. It is not the time to complain about your job or company (university, national laboratory, agency, etc.).

Remember the youth are still deciding upon their careers. It is important for you to portray your field accurately but in as positive manner as possible. If your field is overcrowded, tell them that it is hard to get a job and they will need to do well to enter the field. Perhaps they will need to go to one of a few competitive schools to enter the field. Don't say "It's impossible to get into this field because there are too many in the field" but rather "In order to get into this field, you will have to do well at one of these competitive schools" and list the schools. If the youth goes to one of those schools and does very well, then they might just get that job. Be honest but do not crush the dreams of our youth. If it is hard to obtain, then so state. But do not say it is not possible to get a position.

After being in a field for a number of years, you know all of the negatives of the field. Though you should always be honest, be positive in your evaluation of the field. This is not the time to be discussing all of the frustrations in your field when you know other fields have issues as well. The youth likely cannot put the field into a proper context.

Your position as a role model will likely have more impact on youth than anything you try to teach them. Be that good role model, and one day one of them will come back to tell you your mentoring led them to their career and/or success.

Conclusion - *Have Fun!*

This instructional manual has been written to allow you to understand Scouting, the Supernova awards, youth protection, and mentoring. As in all such documents, there are things that must be done and others to be avoided. That is part of the purpose of any training document.

The purpose of the programs is to show our youth that STEM careers are fun and challenging. Science and mathematics are fun and underlie engineering (also fun) that produces technology (fun, too!) that provides all sorts of interesting and cool products. So show the youth how much fun STEM is.

You may have forgotten how you were fascinated in college – this experience may rekindle your enthusiasm for STEM.

So have fun! Don't make this a serious classroom exercise (unless doing hazardous tasks), but rather an informal mutual appreciation of the beauty of nature all around us. You will be richly rewarded over time by the good you do for America's youth.

So good luck while having FUN!
