

# Scouting Merit Badge



**M**y first encounter with the Scouts and surveying was several years ago when I was asked to make a presentation on surveying to a Den of Cub Scouts. The Den Mother was quite persuasive and my dinner that night hinged on my answer. Yes was easy since I didn't like missing dinner. The next day I called my friend, John, another surveyor and the father of one of the cub scouts. We set a time and location to do our presentation and made plans to bring some equipment and mapping. Because of the age of the kids, we took the fun approach. I had a topography map for them to look at. We explained that contours close together meant a slope and you probably didn't want to go that way. As we talked a little bit about what a surveyor does, and when interest began to fade, we put a tool belt, vest, and hard hat on one of the scouts. Everything was a little big. We took the boys outside and let them look through a level at a rod and talked about what the numbers meant. This group wasn't quite ready for the Lenker Rod. Some surveyors aren't ready for the Lenker Rod. John had brought the secret weapon, a robotic total station. Now we had their attention again. We talked about pacing and let them measure their paces on a 50-foot tape. They were now ready to try and pace 100 feet. We gave them hubs and a hammer and they put their initials on their best guess. We told them we were going to measure with the robotic total station when they finished. Curiously, one boy was not happy with his marking. He was no where near the other scouts. He pulled his hub, paced his distance and now smiling set his hub in the middle of the pack. John fired up the robotic and moved to the correct distance. Oddly, it fell real close to where the one scout had pulled his hub and moved to the pack. I know I've seen this before? Ironically, the boy was John's

son and we now had a good lesson for the boys. Believe in yourself, don't follow the group. A good lesson for the adults too, especially surveyors.

My second encounter with the scouts was a few years later. My son was now a Boy Scout. His Troop Leader was a great guy and, on a snow campout, found out I was a surveyor. He mentioned that there was a Surveying Merit Badge and wanted

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to know if I was interested in helping a few scouts get the badge. He told me it was one of the original scouting merit badges. With all that he was doing, how could I say no. He first asked if I would come to a troop meeting and do a presentation so he could see if there was any interest. Time to call John again. Through the years John and I have crossed paths as sports coaches and interested parents. His son and mine have been friends and John always volunteers. John even got me to follow him through the local chapter of CLSA session of officers.

One evening we made a presentation to the boy scouts. We brought some equipment, hand tools, maps and some trade magazines with cool pictures of pyr-

amids and canyons. The whole presentation took maybe a half an hour. A couple of weeks later, I got a call from the Scoutmaster and there were a lot of kids interested in surveying and the merit badge. It was explained that I needed to become a Merit Badge Counselor and to do this I needed to take a Child Protection class. I had done something like that as a sports coach. It was a couple of hours on a Saturday. Some people were there for scouts and some as sports coaches. We saw a video and talked about the do's and don'ts. I was given a card after completing the class. I then signed an application and submitted it to the Boy Scouts to be a Merit Badge Counselor. It is a two-year commitment and your name is put on a list for boys to call when they are interested in working on a merit badge. Each badge has one or more names. I noticed that there were several surveyors listed in my area.

I then had a call from the scoutmaster telling me he had sixteen boys interested in the scouting merit badge. Sixteen! I was going to have to figure how to do this. I suggested doing groups of four at a time. The boys are required to get the merit badge book ahead of time and look at the requirements. As part of the youth protection, I arranged for adult volunteers to meet with the boys and myself on a Saturday morning.

I went to a local park in my town. It is kind of a natural terrain with oaks and up and down topography. With the help of my son, I laid out a five-sided traverse and measured the angles and distances. I also assumed an elevation of 100 feet on one point (per the merit badge requirements) and ran elevations to the other points. We laid out a 100 foot distance on a level area for pacing (an old merit badge require

*Continued on page 18*

# Scouting Merit Badge

*Continued from page 14*

ment), measured and marked an unknown distance for the scouts to pace.

When I met with my first group on Saturday I gave them a real world scenario. They worked for a private surveying firm and their company was asked to do a boundary and small topography map for an area in the park. The firm had sent a survey crew out the day before. That crew had found and marked the monuments they were going to traverse. Remember, the age group is 10 years to 16 years of age typically. Terminology can be confusing. I also told them we would be running elevations to the points we were first traversing. I had them gather at the back of the truck and showed them the equipment a typical survey truck would have. The machete was by far the favorite. I made a mental note to hide it. There were four other dads there so I was going to have plenty of help. As I began unloading the truck, one of the dads quietly told me he had volunteered because he wanted to know what surveyor really did. I got the idea he figured a half an hour to an hour would be all he needed. I smiled, I didn't want to lose a helper.

At the first station I explained how I was setting up the legs of the tripod over the point and leveling the instrument. I got two boys to volunteer to hold rods and the backsight and foresight locations. I showed them how to use a couple of lath to steady the rod. The one dad that had talked to me earlier asked a lot of questions. I decided he would be great over at the pacing exercise. I told him and one other dad I would send one boy at a time over to count his paces in the 100 foot area and to have them pace the unknown distance. The scouts had to be within 5% or 15 feet of the unknown 300+ foot distance. It took most a couple of tries. One took several but all completed it.

Since there were five stations I showed all what to do at the first station and then let each boy turn angles and measure distances at one of the following stations. My son had worked with me on weekends for a few years and was a big help in showing the boys how to keep the rod plumb and where to go next. I explained how to set up the instrument to each boy but did the set up myself. I think it would have taken too long for the boys to do that part. My instrument had a set zero so it was easy for them to zero on the backsight. I told them which knob to loosen and had them double their angles being careful to turn the correct knob. I checked their sighting and suggested to them to re-sight when they were off. The boys did great. I explain why we doubled angles. Each boy kept notes at his station and shared that information before the next occupation. To make things easier and have a good record of the work the boys were doing I made note sheets up ahead of time. The sheets had occupation points with backsight distances and foresight distances. They recorded their first and second angles and I figured their mean. This seemed to go fairly well and we moved pretty fast.

We then ran levels and again I worked with a different boy for each station. What really helped was the stations were close enough so they could set up between two stations. I also made sure the grade change was small enough to do it in one turn. I had notes made up ahead for this too. The boys just filled in the information.

When we did topography mapping I had the boys use a compass and rag tape. I explained how to do it with the instrument but felt locating trees and rocks would be better for them with a compass. Most had used a compass and this was something they may use in a camp situation.

One of the last requirements (that is no longer a requirement) was to locate a remote height. I picked a light standard in the area we were working. Since these boys have not had trigonometry or even geometry I explained it as simple as I could. A relationship between distance and angle. When we had finished I got a 25-foot rod to check what we had done. Now they believed me.

The last step was to sit down with the boys and draw our traverse. I had got clipboards, protractors, pencils and scales at discount store. I showed the boys which line we were going to assume as north and how to use the protractor and scale to draw the traverse to scale. When they finished I overlaid a CADD plot to check their work. A couple had to redraw their traverse but all finished. When we were finished I had a complete package from each boy proving he had done the work. It had his name and date of the work. The cover was his scaled traverse. We then returned to the truck with our equipment and found an ice chest with cold sodas. It took about four hours to do the work with four boys in a group. I was able to help sixteen boys get their Surveying Merit Badge in just four Saturday mornings. The best part was that I was invited to their Court of Honor to see each boy formally receive his badge.

This year the requirements have changed a little. The pacing is out. The remote height is out. The boys now have to write a metes and bounds legal description. This could easily be done from their traverse work. They also have to get a deed to their property or a property of the counselor's selection. Both are good additions.

I found the work with the boys to be easy and rewarding. They were eager to learn and having things planned out well ahead eliminated any dead time. The California Land Surveyors Association (CLSA) is just beginning a state wide Scouting Program. Please consider volunteering to be a merit badge counselor with your local CLSA Chapter. The effort is minimal and we have a chance show a large number of boys what a great career surveying can be. There is good information on the topic on the CLSA Website ([www.californiasurveyors.org](http://www.californiasurveyors.org)). When I did my first presentation to the Boy Scout Troop I asked, does anybody here like computers? Every hand went up. The kids are eager to see how they can make a living and still have fun. Whether it's working outside on a crew, drawing maps on a computer in an office or running a business, there is something they will enjoy. ❖

