



Surveying

Scouts BSA · STEM

Name

Started

Completed

Surveying is how people measure land and draw accurate maps. You will use real instruments and GPS, measure a lot, and turn your work into a scale drawing. It's hands-on math that helps build roads, homes, and cities.

Requirements

Every official requirement, in plain language. Check the official wording when you sign off (scouting.org/merit-badges/surveying/). Tips and examples are ideas, not extra requirements.

- ☐ **1** Show you know first aid for injuries that can happen while surveying, such as cuts, scratches, snakebite, insect stings, tick bites, heat and cold reactions, and dehydration. Tell your counselor why surveyors should be able to recognize local poisonous plants and animals

Tip: Think about injuries that could happen outdoors while measuring, like cuts, insect stings, or heat illness, and how you'd treat them.

Example: Think about what really happens on a survey crew: sunburn and heat, insect stings, cuts from brush, or a twisted ankle on rough ground. For each, explain how to prevent it and the first aid you'd give.

2 Field survey

Tips for this section: Work with a counselor or surveyor to measure your lot step by step. Write every measurement neatly.

Example for this section: In a park, set a stake at each corner of a five-sided lot your counselor lays out. Set up your instrument over one corner, sight another as your reference, and record the angle and distance to every other corner and to five nearby features, like trees or a big rock. Then measure three of the points with GPS and compare the distances.

- ☐ **2a** Set up an instrument over one corner of a five-sided lot your counselor lays out and sight another corner as a reference. Using radial methods, record the angle and distance to each remaining corner as directed, plus the angle and distance to five nearby features like trees or rocks

- ☐ **2b** Use GPS to measure three of the same points and compare the distances between those points

- ☐ **3** From your requirement 2 field notes, use a protractor and scale to plot the points and draw your survey to scale, adding a title, date, north arrow, scale bar, and a diagram of the lot. Hand in a neat copy

Tip: Use graph paper and a ruler to carefully draw your lot to scale.

Example: On graph paper, choose a scale like 1 inch equals 20 feet. Plot each corner from your field notes, connect the lines, label the lengths and angles, and see how close your shape closes back on the starting point.

- ☐ **4** Use one corner marker from requirement 2 as a benchmark, assuming its elevation is 100 feet. With a level and rod, take and record readings to find the elevations of the other four corners

Tip: Practice with a level instrument alongside your counselor and record elevations as you go.

- ☐ **5** Get a copy of the deed for a property your counselor approves from the local courthouse or a title agency. Discuss the deed's parts and why each matters with your counselor

Tip: Pick a property with your counselor, then get a copy of its deed from the county courthouse or a title company and go over its parts together.

Example: Read the deed with your counselor and find the legal description. Trace the property lines it describes, look for the starting point and bearings, and talk about what happens if two deeds disagree.

- ☐ **6** Discuss emerging surveying tools like drones and laser scanning, including what each does well and poorly

Tip: Look up how drones and scanners help surveyors measure land faster.

Example: Pick one new tool, like a drone that photographs land to build a 3D map or a laser scanner that captures millions of points of a building. Explain what it measures and how it saves time compared with older methods.

- ☐ **7** Explain what GPS is, and discuss with your counselor why it matters and how it is changing surveying

Tip: Talk about how GPS works and how it changed the way surveyors do their jobs.

- ☐ **8** Name three careers that use surveying skills. Research one: training, education, certification, experience, costs, job outlook, starting pay, and advancement. Discuss what you found with your counselor and whether it interests you

Tip: Ask a surveyor what training they needed and what a typical workday looks like.