

Composite Materials

Merit Badge Workbook

Merit badges are earned by doing: reading the pamphlet, practicing the skills, and showing your counselor what you have learned.
This workbook gives you a place to organize your notes and track your progress along the way.
Merit badge counselors may not require the use of this or any similar workbook.
You still must satisfy your counselor that you can demonstrate each skill and have learned the information.
Use the space under each requirement to note what you have done and what you want to talk about, not to write out full answers.
When a requirement says discuss, show, tell, explain, or demonstrate, that is what you must do.
No one may add to or subtract from the official requirements found on scouting.org (Guide to Advancement 7.0.4.8).

Scouting America last updated this badge's requirements page on December 31, 2025.
Requirements change from time to time. Double-check scouting.org before you start.

Scout's name: _____ Unit: _____ Date started: _____

Counselor's name: _____ Phone no.: _____ Email: _____

Links marked "Scouting America resources" are the ones Scouting America shares on its official badge page.
This workbook is unofficial and not endorsed by Scouting America.

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1. Do the following:

(a) Explain to your counselor the most likely hazards you may encounter while working with composite materials and what you should do to anticipate, mitigate, prevent, and respond to these hazards. Describe the appropriate safety gear and clothing that should be used when working with composite materials.

Scouting America resources: Fibreglass Safety 101 (video) · How to Stay Clean and Safe Working With Fiberglass (video)

Hazards when working with composites

Hazard	How I would anticipate, mitigate, prevent, and respond

Safety gear and clothing to use

(b) Explain the precautions that must be taken when handling, storing, and disposing of resins, reinforcements, and other materials used in composites. Include in your discussion the importance of health, safety, and environmental responsibility and awareness.

Scouting America resources: How to Dispose of Epoxy Resin Leftovers and Used Materials (video)
Ultimate Guide to Resin Handling Safety (website)

Precautions for resins, reinforcements, and other materials

When	Precautions
Handling	
Storing	
Disposing	

Why health, safety, and environmental responsibility and awareness matter

(c) Describe what a safety data sheet (SDS) is and tell why it is used.

Scouting America resources: Safety Data Sheets Training (video)

What an SDS is, and why it is used

Requirement 1 completed on _____ counselor initials _____

2. Do the following:

(a) Explain what composite materials are. Include a brief history of composites and how they have developed.

Scouting America resources: Intro to Composites (video) · What is a Composite? (video)

What composite materials are, in my own words

A brief history of composites and how they have developed

(b) Compare the similarities and differences between composites and wood, aluminum, copper, and steel. Describe the physical, electrical, mechanical, corrosive, flammability, cost, and other such properties. For each of these raw materials, give one example of how it can be shaped and used for a specific application.

Scouting America resources: Properties of Materials (video)

Comparing properties

Property	Composites	Wood	Aluminum	Copper	Steel
Physical					
Electrical					
Mechanical					
Corrosive					
Flammability					
Cost					
Other					

The main similarities and differences I found

One example for each raw material

Material	How it can be shaped	A specific application
Wood		
Aluminum		
Copper		
Steel		

Requirement 2 completed on _____ counselor initials _____

3. Describe how composite materials are made. Then do the following:

Scouting America resources: How Do Composites Work? (video)

How composite materials are made

(a) Discuss three different composite reinforcement materials, their positive and negative characteristics, and their uses. Obtain the SDS for each one and discuss the toxicity, disposal, and safe-handling sections for these materials.

Scouting America resources: Introduction to Fibres (video)

Three reinforcement materials

Material	Positive characteristics	Negative characteristics	Uses

What their SDSs say

Material	Toxicity	Disposal	Safe handling

(b) Discuss three different resins used in composites, their positive and negative characteristics, and their uses. Obtain the SDS for each one and discuss the toxicity, disposal, and safe-handling sections for these materials. Include thermoset resins and thermoplastic resins in your discussion.

Scouting America resources: Introduction to Matrix Materials (video)

Three resins

Resin	Thermoset or thermoplastic	Positive characteristics	Negative characteristics	Uses

What their SDSs say

Resin	Toxicity	Disposal	Safe handling

(c) For each of the three resins you chose for requirement 3(b), think of a new application that might be worth developing.

A new application for each resin

Resin from 3(b)	New application that might be worth developing

Requirement 3 completed on _____ counselor initials _____

4. With your parent or guardian's permission and your counselor's approval, do ONE of the following:

☐ **(a)** Visit a company that manufactures or repairs products made with composites. Discuss what you learned with your counselor.

Company I visited _____ Date _____ Makes or repairs _____

What I learned, to discuss with my counselor

☐ **(b)** Find three composites-related websites. Share and discuss what you learned with your counselor.

Three composites-related websites

Website	What I learned

Requirement 4 completed on _____ counselor initials _____

5. Do the following:

Scouting America resources: STEM Flix™ - Fun with Composite Materials with Science Bob (video)
How to Dispose of Epoxy Resin Leftovers and Used Materials (video) · How to Hand Lay Up a Carbon Fibre Skateboard (video)

(a) Use composite materials to complete two projects, at least one of which must come from the Composite Materials merit badge pamphlet. The second project may come from the pamphlet OR may be one you select on your own that has been approved by your counselor in advance.

My two projects

Project	What I made	Where it came from (pamphlet or counselor approved)	Materials I used	Date finished
Project 1				
Project 2				

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(b) With your counselor's assistance, find an appropriate site where the projects can be safely completed under your counselor's supervision and/or the supervision of an adult approved by your counselor who is knowledgeable about composites.

Site where I did the projects _____ Supervising adult _____

(c) With your counselor, determine how the finished projects will be evaluated. Using those guidelines, evaluate the completed projects with your counselor.

How my counselor and I agreed the projects will be evaluated

Evaluating my finished projects

Project	How it measured up to our guidelines
Project 1	
Project 2	

Requirement 5 completed on _____ counselor initials _____

6. Do ONE of the following:

☐ **(a)** Explore careers related to the Composite Materials merit badge. Research one career to learn about the training and education needed, costs, job prospects, salary, job duties, and career advancement. Your research methods may include—with your parent or guardian's permission—an internet or library search, an interview with a professional in the field, or a visit to a location where people in this career work. Discuss with your counselor both your findings and what about this profession might make it an interesting career.

Scouting America resources: Materials Engineer - Careers in Science and Engineering (video)
Materials Science - a Building Block for the Future of Aerospace Technologies (video)
My Job in F1: Rachel, Materials Science Engineer (video)

Career I researched _____ How I researched it _____

What I found out

Topic	What I found
Training and education needed	
Costs	
Job prospects	
Salary	
Job duties	
Career advancement	

What might make this an interesting career

☐ **(b)** Explore how you could use knowledge and skills from the Composite Materials merit badge to pursue a hobby or interest. Research any training needed, expenses, and organizations that promote or support it. Discuss with your counselor what short-term and long-term goals you might have if you pursued this.

Scouting America resources: Surfboard Shaping and Glassing (video) · Making a Skateboard (video)

My hobby or interest

What I found out

Topic	What I found
Training needed	
Expenses	
Organizations that promote or support it	

Goals	If I pursued this
Short-term goals	
Long-term goals	

Requirement 6 completed on counselor initials

Counselor sign-off

Your counselor signs your blue card or approves the badge in Scoutbook, and your unit records it. This line is for your own records.

Counselor's signature Date completed

Official Scouting America resources

Scouting America resources: Composite Materials merit badge page (requirements and resources)
Composite Materials merit badge pamphlet (free PDF) · All merit badges

Made by Cole at ScoutSmarts.com, an Eagle Scout who loves helping Scouts.
Spot an error or a requirement change? Tell me at scoutsmarts.com/contact.
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