

# **Composite Materials**



# Merit Badge Workbook

This workbook can help you but you still need to read the merit badge pamphlet.

The work space provided for each requirement should be used by the Scout to make notes for discussing the item with his counselor, not for providing the full and complete answers. Each Scout must do each requirement.

No one may add or subtract from the official requirements found in **Boy Scout Requirements** (Pub. 33216 – SKU 616334).

The requirements were last issued or revised in 2013	<ul> <li>This workbook was updated in <u>December 2013</u>.</li> </ul>
Scout's Name:	Unit:
Counselor's Name:	
http://www.USScouts.Org  Please submit errors, omissions, comments or suggestions. Comments or suggestions for changes to the requirements for the	s about this workbook to: Workbooks@USScouts.Org
<ul> <li>Do the following:</li> <li>a. Explain to your counselor the most likely hazards you may you should do to anticipate, mitigate and prevent, and res</li> </ul>	y encounter while working with composite materials and what pond to these hazards.
Describe the appropriate safety gear and clothing that sho	ould be used when working with composite materials.

	aterials used in composites. Include in your discussion the importance of health, safety, and environmental esponsibility and awareness.
_	
De	escribe what a material safety data sheet (MSDS) is and tell why it is used.
10	e following:
	xplain what are composite materials.
_	

Composite Materials

2.

Scout's Name:

Include a brief history of	of composites and how they have developed.
electrical, mechanical, corros	differences between composites and wood, aluminum, copper, and steel. Explain the physical, sive, flammability, cost, and other such properties. For each of these raw materials, give one
example for now it can be sn  Composites	aped and used for a specific application.
Physical properties:	
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Electrical properties:	
Licotriodi proportico.	
Machanical properties:	
Mechanical properties:	
O a mara il va na mana anti a a v	
Corrosive properties:	
E1 1999	
Flammability:	
	1

Composite Materials

Scout's Name:

oosite Materials	Scout's Name:
Cost:	
Other properties.	
How can it be shaped an	d used for a specific application.
/ood	
/ood Physical properties:	
Physical properties:	
Physical properties:  Electrical properties:	
Physical properties:  Electrical properties:	
Physical properties:  Electrical properties:	
Physical properties:  Electrical properties:	
Physical properties:  Electrical properties:  Mechanical properties:	

omposite Materials	Scout's Name:
Flammability:	
Cost:	
Other properties.	
How can it be shaped an	nd used for a specific application.
Aluminum	
Aluminum  Physical properties:	
i flysical properties.	
Electrical properties:	
Elocation proportion	
Mechanical properties:	

Corrosive properties:	Scout's Name:
Flammability:	
riammaomey.	
Ozak	
Cost:	
Other properties.	
How can it he shaned a	nd used for a specific application.
Trow darrie bo chaped a	The december of the opposition appropriation.
opper	
opper Physical properties:	
Physical properties:	
Physical properties:	

oosite Materials	Scout's Name:
Mechanical properties:	
Corrosive properties:	
E. 1.33	
Flammability:	
Cost:	
0031.	
Other properties.	
How can it be shaped a	and used for a specific application.
tool	
teel Physical properties:	
, c.cs. proportioo.	

Electrical properties:		_
		_
Mechanical properties:		_
		_
Oiva proportion		
Corrosive properties:		
		_
		_
Flammability:		
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		_
		_
Cost:		
		_
		_
Other properties.		_
11		
How can it be snaped an	d used for a specific application.	٦
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		1

Scout's Name: \_\_\_\_\_

Composite Materials

Then do the following:

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

Composite Reinfo	prcement Material 1:
Positive Characteristics	
Negative	
Characteristics	
Uses.	
Toxicity	
Disposal	
Safe-Handling	
	prcement Material 2:
Positive Characteristics	
Characteristics	
Negative	
Characteristics	
Uses.	
Toxicity	
Disposal	
Safe-Handling	
Composite Reinfo	procement Material 3:
Positive Characteristics	
Ondractonstics	
Negative	
Characteristics	
Uses.	
Toxicity	
Disposal	
Safe-Handling	

Characteristics

Uses.

**Toxicity** 

Composite Materials	Scout's Name:
Disposal	
Safe-Handling	
- · · · ·	
Resin 3:	
Positive Characteristics	
0110100101101101	
No anti-re	
Negative Characteristics	
Uses.	
U5C5.	
Toxicity	
lonioity	
Disposal	
Diopeca.	
Safe-Handling	
<u> </u>	
c. For each of the t	three resins you chose for requirement 3b, think of a new application that might be worth developing.
Resin 1:	
New Application	
Resin 2:	
New Application	
Resin 3:	
New Application	

۾ ٦	ur parent's permission and your counselor's approval do ONE of the following:  Visit a company that manufactures or repairs products made with composites. Discuss what you lear	n with w
_ a.	counselor.	ii wilii y
7 h	Find three composites-related Web sites.	
_	1.	
	2.	
	3.	
	Share and discuss what you learn with your counselor.	

Со	mposite Materials			Scout's Name:
5.	Do the following:			
		a.	merit badg	osite materials to complete two projects, at least one of which must come from the Composite Materials e pamphlet. The second project may come from the pamphlet OR may be one you select on your own een approved by your counselor in advance.
			Project 1	
			Project 2	
		b.	With your of counselor's composites	counselor's assistance, find an appropriate site where the projects can be safely completed under your supervision and/or the supervision of an adult approved by your counselor who is knowledgeable about s.
		C.	With your	counselor, determine how the finished projects will be evaluated.
			Using thos	e guidelines, evaluate the completed projects with your counselor.

posite Materials	Scout's Name:
Find out about three career opportunities in com	posite materials.
1.	
2.	
3.	
Pick one and find out the education, training, an	d experience required for this profession
Career:	a axpendice required for the profession.
Education:	
Eddodiion.	
Training:	
Experience:	
Discuss this will be a second and be a second as the second and the second as the seco	this are for all a miletal interest and
Discuss this with your counselor, and explain wh	ty this profession might interest you.

Requirement resources can be found here:

http://www.meritbadge.org/wiki/index.php/Composite Materials#Requirement resources

6.

### Important excerpts from the Guide To Advancement - 2013, No. 33088 (SKU-618673)

#### [1.0.0.0] — Introduction

The current edition of the *Guide to Advancement* is the official source for administering advancement in all Boy Scouts of America programs: Cub Scouting, Boy Scouting, Varsity Scouting, Venturing, and Sea Scouts. It replaces any previous BSA advancement manuals, including *Advancement Committee Policies and Procedures*, *Advancement and Recognition Policies and Procedures*, and previous editions of the *Guide to Advancement*.

#### [Page 2, and 5.0.1.4] — Policy on Unauthorized Changes to Advancement Program

No council, committee, district, unit, or individual has the authority to add to, or subtract from, advancement requirements. There are limited exceptions relating only to youth members with special needs. For details see section 10, "Advancement for Members With Special Needs".

#### [Page 2] — The "Guide to Safe Scouting" Applies

Policies and procedures outlined in the *Guide to Safe Scouting*, No. 34416, apply to all BSA activities, including those related to advancement and Eagle Scout service projects.

#### [7.0.3.1] — The Buddy System and Certifying Completion

A youth member must not meet one-on-one with an adult. Sessions with counselors must take place where others can view the interaction, or the Scout must have a buddy: a friend, parent, guardian, brother, sister, or other relative—or better yet, another Scout working on the same badge—along with him attending the session.

When the Scout meets with the counselor, he should bring any required projects. If these cannot be transported, he should present evidence, such as photographs or adult verification. His unit leader, for example, might state that a satisfactory bridge or tower has been built for the Pioneering merit badge, or that meals were prepared for Cooking. If there are questions that requirements were met, a counselor may confirm with adults involved. Once satisfied, the counselor signs the blue card using the date upon which the Scout completed the requirements, or in the case of partials, initials the individual requirements passed.

Note that from time to time, it may be appropriate for a requirement that has been met for one badge to also count for another. See "Fulfilling More Than One Requirement With a Single Activity," 4.2.3.6.

#### [7.0.3.2] — Group Instruction

It is acceptable—and sometimes desirable—for merit badges to be taught in group settings. This often occurs at camp and merit badge midways or similar events. Interactive group discussions can support learning. The method can also be attractive to "guest experts" assisting registered and approved counselors. Slide shows, skits, demonstrations, panels, and various other techniques can also be employed, but as any teacher can attest, not everyone will learn all the material.

There must be attention to each individual's projects and his fulfillment of *all* requirements. We must know that every Scout —actually and *personally*— completed them. If, for example, a requirement uses words like "show," "demonstrate," or "discuss," then every Scout must do that. It is unacceptable to award badges on the basis of sitting in classrooms *watching* demonstrations, or remaining silent during discussions. It is sometimes reported that Scouts who have received merit badges through group instructional settings have not fulfilled all the requirements. To offer a quality merit badge program, council and district advancement committees should ensure the following are in place for all group instructional events.

- Merit badge counselors are known to be registered and approved.
- Any guest experts or guest speakers, or others assisting who are not registered and approved as merit badge counselors, do not accept the
  responsibilities of, or behave as, merit badge counselors, either at a group instructional event or at any other time. Their service is temporary, not
  ongoing.
- Counselors agree not to assume prerequisites have been completed without some level of evidence that the work has been done. Pictures and
  letters from other merit badge counselors or unit leaders are the best form of prerequisite documentation when the actual work done cannot be
  brought to the camp or site of the merit badge event.
- There is a mechanism for unit leaders or others to report concerns to a council advancement committee on summer camp merit badge programs, group instructional events, and any other merit badge counseling issues—especially in instances where it is believed BSA procedures are not followed. See "Reporting Merit Badge Counseling Concerns," 11.1.0.0.
- There must be attention to each individual's projects and his fulfillment of all requirements. We must know that every Scout—actually and personally—completed them.

## [7.0.3.3] — Partial Completions

A Scout need not pass all the requirements of one merit badge with the same counselor. It may be that due to timing or location issues, etc., he must meet with a different counselor to finish the badge. The Application for Merit Badge has a place to record what has been finished—a "partial." In the center section on the reverse of the blue card, the counselor initials for each requirement passed. In the case of a partial completion, the counselor does not retain his or her portion of the card. A subsequent counselor may choose not to accept partial work, but this should be rare. A Scout, if he believes he is being treated unfairly, may work with his unit leader to find another counselor. An example for the use of a signed partial would be to take it to camp as proof of prerequisites. Partials have no expiration except the Scout's 18th birthday. Units, districts, or councils shall not establish other expiration dates for partial merit badges.

#### [7.0.4.8] — Unofficial Worksheets and Learning Aids

Worksheets and other materials that may be of assistance in earning merit badges are available from a variety of places including unofficial sources on the Internet and even troop libraries. Use of these aids is permissible as long as the materials can be correlated with the current requirements that Scouts must fulfill. Completing "worksheets" may suffice where a requirement calls for something in writing, but this would not work for a requirement where the Scout must discuss, tell, show, or demonstrate, etc. Note that Scouts shall not be required to use these learning aids in order to complete a merit badge.