



COMPOSITE MATERIALS MERIT BADGE WORKBOOK

This Scoutmaster Bucky Merit Badge Workbook is based off the 2021 Scouts BSA Requirements.

Consider also using the Composite Materials merit badge class preparation page for clarification and expectations when participating in a Scoutmaster Bucky merit badge opportunity (online or in-person).

<https://scoutmasterbucky.com/merit-badges/composite-materials/>

Scout's Name:

REQUIREMENT 1: Do the following:

REQUIREMENT 1A: Explain to your counselor the most likely hazards you may encounter while working with composite materials and what you should do to anticipate, mitigate, and prevent, and respond to these hazards. Describe the appropriate safety gear and clothing that should be used when working with composite materials.

REQUIREMENT 1B: 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.



REQUIREMENT 1C: Describe what a material safety data sheet (MSDS) is and tell why it is used.

REQUIREMENT 2: Do the following:

REQUIREMENT 2A: Explain what composite materials are. Include a brief history of composites and how they have developed.

REQUIREMENT 2B: 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.



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

REQUIREMENT 3A: 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.

REQUIREMENT 3B: Discuss three different resins used in composites, 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. Include thermoset resins and thermoplastic resins in your discussion.

REQUIREMENT 3C: For each of the three resins you chose for requirement 3b, think of a new application that might be worth developing.



REQUIREMENT 4: With your parent's permission and your counselor's approval do ONE of the following:

REQUIREMENT 4A: Visit a company that manufactures or repairs products made with composites. Discuss what you learn with your counselor.

REQUIREMENT 4B: Find three composites-related websites. Share and discuss what you learn with your counselor.

REQUIREMENT 5: Do the following:



REQUIREMENT 5A: 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.

REQUIREMENT 5B: 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.

REQUIREMENT 5C: With your counselor, determine how the finished projects will be evaluated. Using those guidelines, evaluate the completed projects with your counselor.

REQUIREMENT 6: Find out about three career opportunities in composite materials. Pick one and find out the education, training, and experience required for this profession. Discuss this with your counselor, and explain why this profession might interest you.