

COMPOSITE MATERIALS MERIT BADGE WORKBOOK

This Scoutmaster Bucky Merit Badge Workbook is based off the current *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 1 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 and prevent, and respond to these hazards. Describe the appropriate safety gear and clothing that should be used when working with composite materials.

Most likely hazards

Anticipate hazards

Mitigate and prevent hazards

Respond to these hazards

Appropriate safety gear and clothing

REQUIREMENT 1 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.

Precautions that must be taken

Importance of health, safety, and environmental responsibility and awareness

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

REQUIREMENT 2: Do the following:

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

What composite materials are

Brief history of composites and how they have developed

REQUIREMENT 2 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.

Composites and wood - similarities and differences

Composites and aluminum - similarities and differences

Composites and copper - similarities and differences

Composites and steel - similarities and differences

How each material can be shaped and used for a specific application

Composites

Wood

Aluminum

Copper

Steel

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

How composite materials are made

REQUIREMENT 3 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.

First composite reinforcement material, its positive and negative characteristics, and its uses

☐ Obtained SDS

Second composite reinforcement material, its positive and negative characteristics, and its uses

☐ Obtained SDS

Third composite reinforcement material, its positive and negative characteristics, and its uses

☐

Obtained SDS

REQUIREMENT 3 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.

First resin used in composites, its positive and negative characteristics, and its uses

☐ Obtained SDS

Second resin used in composites, its positive and negative characteristics, and its uses

☐ Obtained SDS

Third resin used in composites, its positive and negative characteristics, and its uses

☐ Obtained SDS

REQUIREMENT 3 C: 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 4 A: Visit a company that manufactures or repairs products made with composites. Discuss what you learn with your counselor.

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

REQUIREMENT 5: Do the following:

REQUIREMENT 5 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.

☐

Completed first project

☐

Completed second project

REQUIREMENT 5 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.

☐

Completed

REQUIREMENT 5 C: 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.

Three career opportunities in composite materials

Education, training, and experience required for one profession