



COMPOSITE MATERIALS

The 2012 Spring PowWow Official Merit Badge Worksheet.

Scout's Name

Instructor's Name

Scout's Address

City

State

Zip

Instructions

- 1) The Scout is to review the merit badge book before the first week of the PowWow.
- 2) Bring this worksheet, paper, and pen or pencil each week.
- 3) **Bring a Merit Badge blue card with you on the second week.**

Requirement Instructions

- 1) Requirements 1, 2, 3, and 6 should be completed during the two sessions of the PowWow.
- 2) Requirements 4 and 5 must be completed as **homework** between the two sessions of the PowWow.

***Due to possible time constraints at the PowWow, certain requirements that were originally planned to be completed in class may need to be completed as homework. Please LISTEN to ALL INSTRUCTIONS in class to be aware of any changes.**

Requirement 1

Initial

Do the following:

a. 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.

b. Describe what a material safety data sheet (MSDS) is and tell why it is used.

Requirement 2

Initial

Do the following:

a. Explain what composite materials are:

Include a brief history of composites and how they have developed.

b. Compare the similarities and differences between composites, wood, aluminum, copper, and steel.

Composites

Explain the physical,

electrical,

mechanical,

corrosive,

flammability,

cost,

and other such properties.

For each of these raw materials, give one example for how it can be shaped and used for a specific application.

Wood

Explain the physical,

electrical,

mechanical,

corrosive,

flammability,

cost,

and other such properties.

For each of these raw materials, give one example for how it can be shaped and used for a specific application.

Aluminum

Explain the physical,

electrical,

mechanical,

corrosive,

flammability,

cost,

and other such properties.

For each of these raw materials, give one example for how it can be shaped and used for a specific application.

Copper Steel

Explain the physical,

electrical,

mechanical,

corrosive,

flammability,

cost,

and other such properties.

For each of these raw materials, give one example for how it can be shaped and used for a specific application.

Steel

Explain the physical,

electrical,

mechanical,

corrosive,

flammability,

cost,

and other such properties.

For each of these raw materials, give one example for how it can be shaped and used for a specific application.

Requirement 3

Initial

Describe how composite materials are made. 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 Reinforcement Material 1:

Positive Characteristics

Negative Characteristics

Uses.

Toxicity

Disposal

Safe-Handling

Composite Reinforcement Material 2:

Positive Characteristics

Negative Characteristics

Uses.

Toxicity

Disposal

Safe-Handling

Composite Reinforcement Material 3:

Positive Characteristics

Negative Characteristics

Uses.

Toxicity

Disposal

Safe-Handling

b. 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.

Resin 1:

Positive Characteristics

Negative Characteristics

Uses.

Toxicity

Disposal

Safe-Handling

Resin 2:

Positive Characteristics

Negative Characteristics

Uses.

Toxicity

Disposal

Safe-Handling

Resin 3:

Positive Characteristics

Negative Characteristics

Uses.

Toxicity

Disposal

Safe-Handling

c. For each of the 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

Requirement 4

Initial

With your parent'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 learn with your counselor.

- b. Find three composites-related Web sites. Share and discuss what you learn with your counselor.

Requirement 5

Initial

Do the following:

- 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.

Project 1

Project 2

- 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.

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

Requirement 6

Initial

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.

Merit badge worksheets will not be accepted at the Council Office in place of the official Merit Badge Application Card. Those who do not complete all the requirements should take their partially completed merit badge worksheet and their official application card to their local merit badge counselors for completion.