



Composite Materials

Merit Badge Worksheet

2006 Rev. Created
by Craig Long 2010

Scouts Name _____

Date _____

Counselor's Name _____

Counselor's Phone # _____

Complete

1. 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. _____

Complete

2. Do the following:

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

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

Explain the properties of the materials listed below

Composites:

Physical	
Electrical	
Mechanical	
Corrosive	
Flammability	
Cost	
other properties	

Give one example for how it can be shaped and used for a specific application. _____

Wood:

Physical	
Electrical	
Mechanical	
Corrosive	
Flammability	
Cost	
other properties	

Give one example for how it can be shaped and used for a specific application. _____

Aluminum:

Physical	
Electrical	
Mechanical	
Corrosive	
Flammability	
Cost	
other properties	

Give one example for how it can be shaped and used for a specific application. _____

Copper:

Physical	
Electrical	
Mechanical	
Corrosive	
Flammability	
Cost	
other properties	

Give one example for how it can be shaped and used for a specific application. _____

Steel:

Physical	
Electrical	
Mechanical	
Corrosive	
Flammability	
Cost	
other properties	

Give one example for how it can be shaped and used for a specific application. _____

Complete

3. 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.

Reinforcement material 1.

Positive characteristics _____
Negative characteristics _____
Uses _____
Toxicity _____
Disposal _____
Safe Handling _____

Reinforcement Material 2.

Positive characteristics _____
Negative characteristics _____
Uses _____
Toxicity _____
Disposal _____
Safe Handling _____

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 material 1.

Positive characteristics _____

Negative characteristics _____

Uses _____

Toxicity _____

Disposal _____

Safe Handling _____

Resin Material 2.

Positive characteristics _____

Negative characteristics _____

Uses _____

Toxicity _____

Disposal _____

Safe Handling _____

Resin Material 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.

New applications

1. _____

2. _____

3. _____

Complete

4. 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. _____

Complete

5. 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.

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. _____

Complete

6. Find out about three career opportunities in composite materials.

1. _____
2. _____
3. _____

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.
