





(50 pts) Approx. 3 days

Composite materials have a variety of properties that we can use to our advantage. Engineers look for composite materials that are strong because then they can make more durable designs that are lighter or less expensive. In addition, composites can also have hybrid thermal (heat) properties that can make them more resistant to heat than simpler materials. In this part of the unit, you'll design different composite tiles that might be able to withstand greater and greater amounts of heat!

1. Start by watching the *More About Composites*, *Thermal Properties*, and *More About Thermal Properties* presentations. Take a full page of notes on these ideas. Make sure that your notes include examples of how different composites are used in for their thermal properties.
2. **Build Your Samples:** Each person is responsible for creating and testing three (3) different composite samples. Every sample must be a square that is 6" long and 6" wide. The thickness of each sample will differ based on the sample you choose to make.
  - a. The samples must be made of the materials available: foam, wire mesh, foil, etc
  - b. The samples must be able to hold themselves together (they must be wired or glued into a single piece
  - c. Each sample needs an eye-bolt hot-glued to the center of one side for mounting in our testing device.
3. **Burn Your Samples:** Each person is responsible for burning their own samples using the blowtorch. Talk with Mr. Benshoof as you set this up and before you burn any samples. The fume hood must be on, and the data collection must be monitored at all times. You will collect data on how long it takes for the temperature on the back to increase to a certain threshold OR how long it takes for the hot-glue to melt and the tile to fall off the mount. Again, talk with Mr. Benshoof to confirm the data collection process!

Part 1: Tasks	10 points	8-5 point	4-0 points
 Notes on Composites	+ You took a full page of notes on <i>More About Composites</i> , <i>Thermal Properties</i> , and <i>More Thermal Properties</i>	- Your notes do not cover all topics - Your notes are lacking important parts	- Your notes are missing - Your notes are missing many important parts
	<b>15 points</b>	<b>14-9 point</b>	<b>8-0 points</b>
 Plan & Build Composite Samples	+You made a written plan and drawing that describes how you will build your composites + You successfully built your 3 needed samples per person	- Your written plan is too brief - You only built 2 samples	- Your notes are missing - You only built 1 sample - You built no samples
 Burn Test Samples	+ You successfully tested all 3 samples + You collected your data as described by Mr. Benshoof + You shared your data to the class spreadsheet	- You tested fewer than 3 samples - You did not get the proper data - You did not share the data	- You did not test any samples - Your work is missing multiple parts
	<b>10 points</b>	<b>8-5 point</b>	<b>4-0 points</b>
 Take the Unit 5 Quiz	+ You took the Unit 5 Quiz by the due date + Your grade will be based on the number you get correct	N/A	- You did not take the Unit 5 Quiz

