

COMPOSITE MATERIALS

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#CloserLookUSM

Video: <https://www.youtube.com/watch?v=gU5KTIqjC74>

LAB EXERCISE



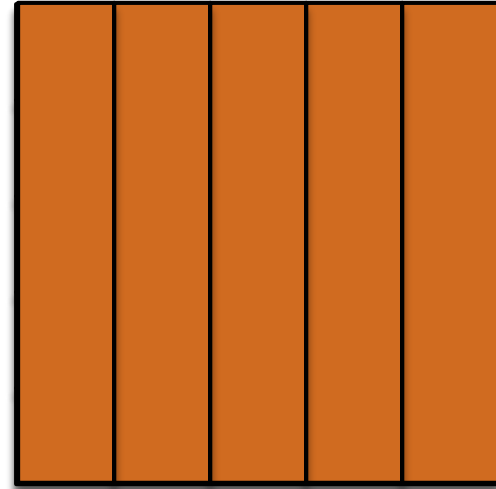
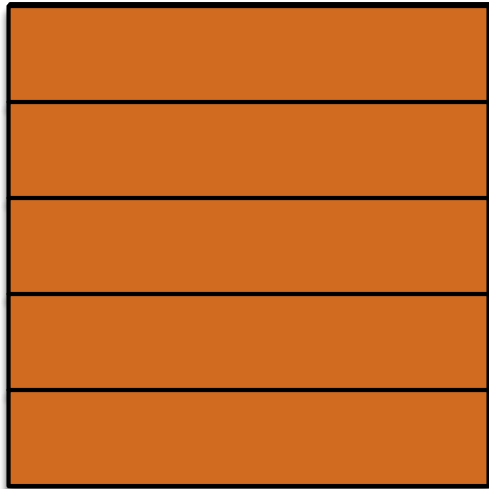
- Each group will compete to see who can build the strongest structure/composite. Please note:
 1. Each group member should cut 15-20 sticks that are 5 mm in width
 2. Brainstorm with your group and test your sticks to determine the optimal/strongest design
 - ▶ READ the lab procedure for tips
 - ▶ Collect data to defend the chosen design
 3. Make the chosen design using glue and we will have the competition during the next lab!

LAB EXERCISE



- Please be safe!
- Use caution when cutting the balsa wood
 - If it can cut the wood....it can cut you
- Have your lab goggles/glasses on at all times
- Be aware of falling weights when the materials break
- Do not hang your structures too high from the surface
 - This will reduce loud sounds and possible injuries

WHAT INTERESTS YOU?



I. Purpose/Question

WHAT INTERESTS YOU?

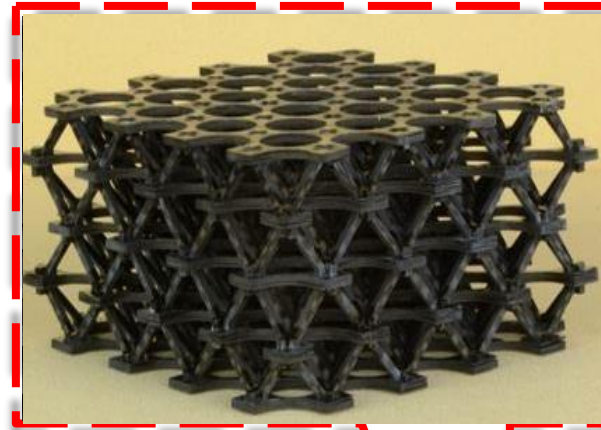


I. Purpose/Question

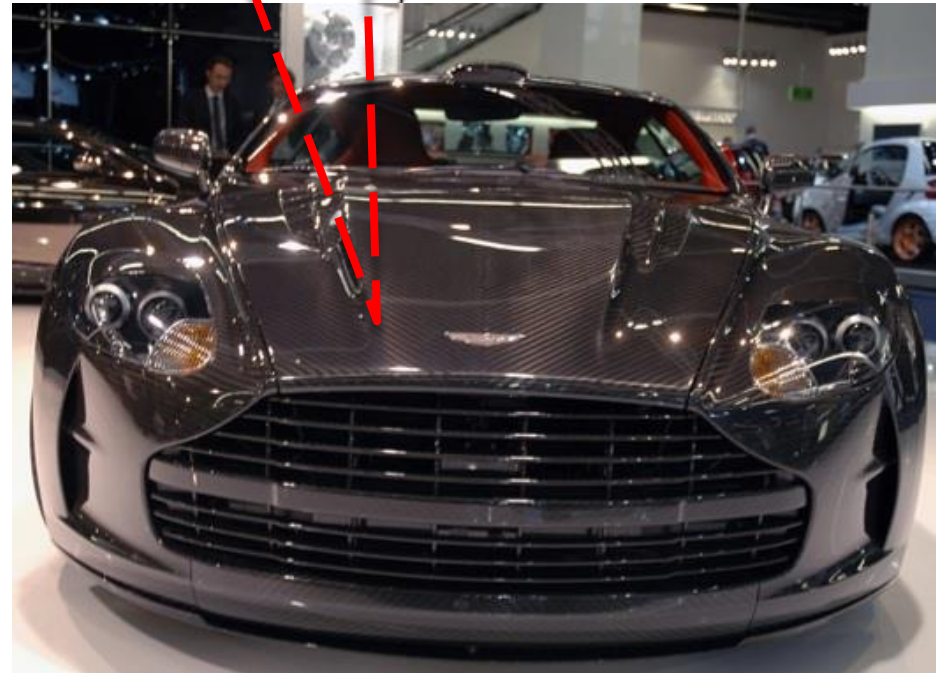
COMPOSITES?

Composites:

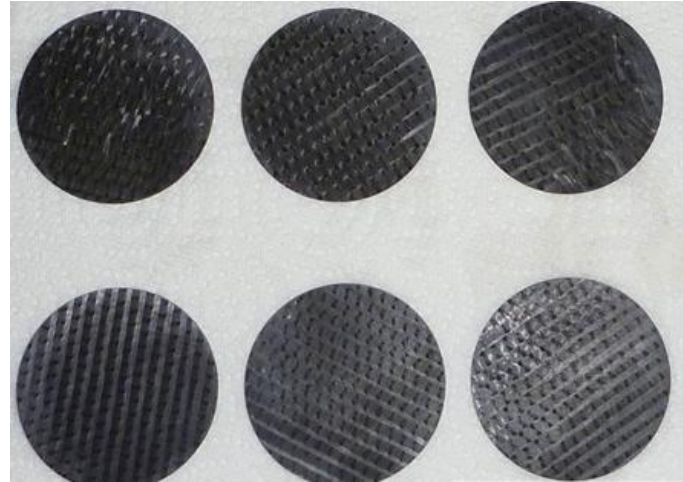
Solid material composed of binder or matrix surrounding and holding reinforcements in place



FIBER



WHAT IS KNOWN ALREADY?



2. Research



- ▶ Connect your research to your original question/purpose
- ▶ What do you think will happen?
- ▶ Can you defend why you think this happen?
- ▶ Make a hypothesis (educated guess) of what you think will happen or the outcome of your question/purpose
 - ▶ Example: If I.....then.....will happen

3. Hypothesis



**KEEP
CALM
AND
TEST YOUR
HYPOTHESIS**

**4. Experiment
(Test your hypothesis = THE FUN PART!)**



- ▶ Record your data in great detail
 - ▶ Write data in lab notebook (use a pen NOT a pencil)
 - ▶ Take photos of your experiment and surprising/interesting results (“A picture worth 1,000 words” – Chinese Proverb)
- ▶ Put results into tables, plots, etc. to organize and find a relationship between the data

5. Analysis



- ▶ Review your data to see if your hypothesis was correct
 - ▶ If your hypothesis was incorrect...**NO WORRIES!** If we knew all of the answers there would be no reason to do research!
 - ▶ Sometimes, bad news can be as helpful as good news!

- ▶ Use your research to defend your conclusions
 - ▶ Has anyone else reported the same results?
 - ▶ Are your results explained by any theories or principles you have learned in class or read in textbooks?

- ▶ Put everything in a report to share with everyone
 - ▶ Report should include the following sections:
Introduction, Experimental, Results, Discussion, Conclusion

6. Conclusion



1. Purpose/Question
2. Research
3. Hypothesis
4. Experiment
5. Analysis
6. Conclusion

An organized method to find the answer to your research question

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Award # 0947944

Questions?

Tiebreaker!!!!

What is the SI unit (symbol or spelled out) for:

1.) time

2.) length

Answer:

1.) seconds (s)

2.) meter (m)

What is the element symbols for:

1.) Carbon

2.) Nitrogen

3.) Gold

4.) Potassium

5.) Silver

Answer:

1.) C

2.) N

3.) Au

4.) K

5.) Ag

Calculate the %Composition of the elements in Cu_2S ?

Answer:

1.) Calculate molar mass:

$$2 \text{ mol Cu} \times \frac{63.55 \text{ g Cu}}{1 \text{ mol Cu}} = 127.1 \text{ g Cu}$$

$$1 \text{ mol S} \times \frac{32.07 \text{ g S}}{1 \text{ mol S}} = 32.07 \text{ g S}$$

2.) Divide mass of element by molar mass

$$\frac{127.1 \text{ g Cu}}{159.2 \text{ g Cu}_2\text{S}} \times 100 \% = 79.84\% \text{ Cu}$$

$$\frac{32.07 \text{ g S}}{159.2 \text{ g Cu}_2\text{S}} \times 100 = 20.14\% \text{ S}$$