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
1. Purpose/Question
WHAT INTERESTS YOU?

1. Purpose/Question
Composites:

Solid material composed of binder or matrix surrounding and holding reinforcements in place
WHAT IS KNOWN ALREADY?

2. Research
WHAT DO YOU THINK WILL HAPPEN?

- 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
4. Experiment
(Test your hypothesis = THE FUN PART!)
MAKE CONNECTIONS

▶ 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
SHARE THE INTERESTING NEWS

- 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
SCIENTIFIC METHOD

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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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 \( \text{Cu}_2\text{S} \)?

**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

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

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