**Student Worksheet: Covering Carbon**

**Directions**: Read the *Science News* article “A thousands-year-old log demonstrates how burying wood can fight climate change” and discuss the following question with your class: How does burying wood disrupt the carbon cycle?

**Calculating Carbon**Ning Zeng and his colleagues plan to test their method of storing carbon by burying 35 metric tons of wood. Do you think this test accurately shows the scale of carbon sequestering needed to mitigate climate change? Using a calculator, answer the following questions.

**Assumptions**

Before diving into calculations, a few approximations need to be made. Do you think that all types of wood contain the same amount of carbon? What would you need to know about a certain type of wood to determine the percent of carbon in it?

**Carbon dioxide sequestered by the experiment**

1. Ning Zeng and his colleagues plan to test their method of storing carbon by burying 35 metric tons of wood. Assuming this type of dry wood is roughly 50% carbon by weight, how much carbon is stored in 35 metric tons of dry wood? Give your answer in metric tons.

2. Using a periodic table, what is the atomic mass of carbon dioxide (CO2)?

3. What is the percentage of carbon by mass in carbon dioxide? Use your answer from question 2.

4. Using your answers from questions 1 and 3, how many metric tons of carbon dioxide are being sequestered if 35 metric tons of dry wood is buried? If 1 metric ton is equal to 1,000 kilograms, what is your answer in kilograms (kg)?

**Annual carbon sequestration to mitigate carbon emissions**
5. According to the *Science News* article, 10 gigatons of atmospheric carbon needs to be captured and stored annually by 2060. How much carbon dioxide in kg does 10 gigatons of atmospheric carbon represent?

6. Compare your answers to questions 4 and 5. Would the experiment significantly help with the total amount of carbon dioxide that needs to be sequestered annually?

**Visualizing the amount of buried wood needed to mitigate carbon emissions**
7. How many gigatons of dry wood would need to be buried to sequester 10 gigatons of atmospheric carbon?

8. Convert your answer to question 7 into pounds. For reference, 1 metric ton is equal to 2,205 pounds. (*Note: 1 metric ton is not equivalent to 1 ton. Use the metric ton conversion provided.*)

9. Assume that the dry wood weighs an average of 30 pounds per cubic foot. How much space would the wood take up?

10. If a football field is 57,600 square feet, how many football fields would it take to bury 10 gigatons of atmospheric carbon if the wood were stacked 20 feet high?

11. Is it realistic to bury the amount of wood needed to store 10 gigatons of atmospheric carbon every year? Why or why not?

**Considering Carbon**

Ning Zeng and his colleagues were trying to demonstrate a proof-of-concept, not suggesting that burying wood was the best, or the only, solution to reduce the amount of atmospheric carbon.

Develop a plan to sequester atmospheric carbon inspired by this proof-of-concept. You must:

* Describe a plan that considers cost, time, and available resources
* Describe how your plan impacts the carbon cycle
* Identify what biomass should be buried
	+ Identify how the biomass is sourced
* Describe how the biomass should be buried
	+ Identify vault dimensions, location, depth, and distribution
* Describe how your plan complements other carbon sequestration techniques