Data Collection & Reflection Worksheet for Module 2 HOA C

Class/Period: _____ Date: _____

Group Members: _____

_____

Part A: Experimental Setup Data

Use the table below to set up and record initial conditions for each treatment:

Cup	Treatment	Materials Added	Starting Color	Starting pH
A	Control ($CuSO_4$ only)	10 mL $CuSO_4$ solution	Blue	*(record)*
B	Soil	10 mL $CuSO_4$ + 6.0 g potting soil	Blue	*(record)*
C	Soil + Biochar	10 mL $CuSO_4$ + 4.0 g soil + 2.0 g biochar	Blue	*(record)*

Part B: Observations After Settling

After the settling period, observe each cup. Note the clarity (color change) and measure the pH using test strips. Record your observations in the table:

Cup	Final Color & Clarity	Final pH	Notes (odor, particles, etc.)
A (Control)	*(e.g., cloudy blue, etc.)*	*(record)*	*(e.g., strong odor? any sediment?)*
B (Soil)	*(e.g., slightly clearer?)*	*(record)*	*(e.g., soil settled at bottom)*
C (Soil + Biochar)	*(e.g., clearest)*	*(record)*	*(e.g., biochar settled; water clearer)*

Reflection and Analysis

1. **Which treatment resulted in the clearest water? Why do you think this treatment was most effective at removing the "pollutant"?**
   (Compare the clarity of Cups A, B, and C. Explain what difference you see and why having soil and biochar might change the outcome.)
2. **Did you observe any differences in pH between the treatments? If so, how did the pH change, and what might that indicate?**

(Note if Cups B or C had a higher or lower pH than the control. What could soil and biochar be doing to the acidity of the solution?)

3. **What does the difference between Cups A, B, and C tell you about biochar's role in water purification?**
   (Explain how adding biochar (along with soil) affected the water quality, and what that means for using biochar as a filter or treatment for polluted water.)
4. **Beyond water purification, what other benefits or uses of biochar can you think of (or recall from class)?**
   (Hint: Biochar is produced from organic waste. Consider its impact on greenhouse gases and soil health. How might turning waste into biochar instead of letting it rot or burn help the environment?)

Skills You'll Use

- **Accurate Measurement:** Handling small quantities of materials (grams, milliliters) and using pipettes and pH strips correctly.
- **Controlled Experimentation:** Setting up a controlled comparison with variables (soil, biochar vs. none) and a control (Cup A) to test one factor at a time.
- **Observation & Data Recording:** Making careful visual observations (color changes, clarity) and measuring pH, then documenting results immediately and systematically.
- **Evidence-Based Reasoning:** Comparing the outcomes of different treatments to draw conclusions about biochar's effectiveness.
- **Real-World Connection:** Linking experimental results to real environmental solutions – seeing how a product of waste (biochar) can be used to address pollution, and thinking about its role in a **circular economy** (turning waste into a resource).

Remember: This activity is not just about chemistry in a cup – it's showing how something we might consider "waste" (like agricultural leftovers turned into biochar) can become a tool to solve problems. We're exploring the idea of a circular system: using a waste-derived material to clean water and improve the environment. How might experiments like this inspire larger solutions on our campus or in our community?