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WRITING SAMPLE

Constructing Wetlands ***- Arts and Craft Supplies Required***

In my fifth-grade science class, I was the proud owner of a model ecosystem. Composed of crappily formed clay animals and paper plants, my wetland was certainly A-worthy. My imagination ran wild: I could imagine this carefully constructed shoebox to be a real, functioning ecosystem. Really, how hard could building an ecosystem be?

With the alarming spike in global temperatures and the continued discharge of contaminated wastewater into natural ecosystems, the demand for robust and innovative environmental solutions is more urgent than ever. Constructed wetlands offer a compelling answer: engineered systems that harness the natural processes of plants, soils, and microbial communities to mitigate water pollution.

These artificial wetlands are already in use across more than 50 countries and on every continent except Antarctica (Wu et al., 2023). Both natural and constructed wetlands function as carbon sinks, drawing carbon dioxide from the atmosphere and sequestering more carbon than they release (Konyn, 2021). Perhaps more critically, they improve water quality by detoxifying chemicals introduced through agricultural and industrial runoff, filtering sediments, and enhancing key hydrological processes like evapotranspiration, infiltration, and groundwater recharge.

Despite their advantages, the construction of wetlands is a meticulous process. Hydrology is fundamental to their success, as the large surface area of wetland water makes the system particularly sensitive to environmental fluctuations (DuPoldt, n.d.). The substrates—such as soil, sand, gravel, and rock—not only provide structural stability but also support the ecological functions of the wetland. Over time, sediments and organic litter accumulate due to low water velocities and high productivity, effectively trapping contaminants that would otherwise pollute surrounding water sources.

Vegetation, too, plays a vital role. As many of us first learned in middle school science, plants absorb carbon dioxide and release oxygen, helping to sequester carbon that drives climate change and contributes to ozone

depletion. In wetlands, this biological process operates at scale, making vegetation a key asset in climate and water quality strategies.

Still, constructing a functional wetland is no simple task. Characterizing the source, volume, quality, and variability of the incoming water is complex and site-specific (Constructing Constructed Wetlands, n.d.). Assessing feasibility requires consideration of topography, soil composition, geology, hydrogeology, legal ownership, ecological protections, and even archaeological and cultural significance. And once construction begins, the challenges continue. Growing appropriate vegetation and managing sediment accumulation are ongoing hurdles.

Is it more difficult than a fifth-grade science project? Absolutely. But the environmental benefits of constructed wetlands—improving water quality, capturing carbon, and enhancing ecosystem resilience—make them well worth the effort. Though my teacher at the time may have said building an artificial ecosystem could only be done with arts and crafts supplies, our reality provides us with the tools to construct one–a project that would certainly be awarded an A+.

References

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