



2016 Scope of Service Columbus Department of Public Utilities

This working agreement is entered into on _____ and becomes effective on the date of the last signature. The grant agreement expires one year from the date of the last signature. The agreement is subject to the limitations of authorities, resources and policies of the Grange Insurance Audubon Center (GIAC) and the City of Columbus (the City).

The following scope of service outlines GIAC's plans to develop STEM curriculum and at the same time ensure integration between the STEM curriculum and the interactive storm water exhibits. GIAC staff are committed to working side-by-side with the contracted team throughout the design phase, providing guidance regarding STEM education for inclusion in the design as well as developing, reviewing and evaluating curriculum options throughout the process. It is our goal to emerge from the design phase with a cohesive, seamless curriculum design in which students will utilize the interactive exhibits as they explore and put into practice the scientific method.

Current GIAC curriculum focuses on birds, habitats, aquatic habitats (in-depth), and conservation including the green/LEED features of the Center and the Metro Park as a whole. Under the current design, students visit the Center/Metro Park three times and GIAC staff visit the schools once. Each field trip visit is 2½ hours in length. The GIAC curriculum employs all aspects of the building and the site to reinforce classroom learning, most especially putting into practice the scientific method. Students ask questions, develop hypotheses, determine how they will test the hypothesis, implement their research design, collect data, crunch the data and draw conclusions. In follow up discussions, students learn the importance of rigorous research design, technique, and replication.

Aspects of the current curriculum will be easily tweaked to incorporate storm water messages. Using the 4th grade common core standards as an example, students are required to demonstrate science knowledge and to interpret and communicate science concepts. Illustrations include the following:

- Plan, build and use a model (such as a small-scale stream table) that can demonstrate the formation of a landform or feature that formed through contact with water, (alluvial fan, sinkhole, mid-channel bar, canyon, valley, depositional islands.) What factors accelerate the processes? What factors must exist for the landform to form? Share findings with the class.
- Using topographical or aerial maps, locate areas that have been formed through deposition and erosion. Include areas of Ohio that have been impacted by glacial ice or movement. Discuss findings with the class.

In reviewing the core standards, it seems our greatest impact will be in the development of curriculum related specifically to designing technological/engineering solutions using science concepts. This “requires (the) student to solve science-based engineering or technological problems through the application of scientific inquiry. Within given scientific constraints, propose or critique solutions, analyze

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and interpret technological and engineering problems, use science principles to anticipate effects of technological or engineering design, find solutions using science and engineering or technology, consider consequences and alternatives, and/or integrate and synthesize scientific information.”

Following curriculum to help students understand watersheds, run-off, and impact on water quality, we would see engaging students in analyzing the current built environment and infrastructure. Instruction would then focus on current innovations and technologies to address storm water management. Utilizing the village, digital stream tables, and the storm water management features of the Center itself, students would then be asked to update and/or create improved systems for storm water management.

While we would incorporate this curriculum into our existing modules as it makes sense, we see this as a stand-alone curriculum in its own right for students K through 12. This supports the science core curriculum in the following ways and calling for specific student outcomes:

PreK-4

- Identify problems and potential technological/engineering solutions
- Understand the design process, role of troubleshooting
- Understand goals of physical, informational and bio-related technologies
- Understand how physical technologies impact humans

Grades 5-8

- Understand and be able to select and use physical and informational technologies
- Understand how all technologies have changed over time
- Recognize role of design and testing in the design process
- Apply research, innovation and invention to problem solving

Grades 9-12

- Demonstrate an understanding of the relationship among people, technology, engineering and the environment
- Identify a problem or need, consider design criteria and constraints
- Integrate multiple disciplines when problem solving
- Synthesize technological and engineering knowledge and design in problem solving
- Apply research, development, experimentation and redesign based on feedback to problem solving
- Build, test, and evaluate a model or prototype that solves a problem or a need

The interactive storm water exhibits will serve as ideal teaching tools for all of the above concepts and outcomes.

GIAC will provide the following strategies and actions:

1. Participate in all planning sessions with the design firm.
2. Research existing K-12 curricula related to storm water management.
3. Interview K-12 teachers regarding their STEM needs.
4. Meet with science coordinators.

5. Pull together a team of educators for the curriculum development.
6. Circulate a draft curriculum for comment.
7. Develop evaluation tools and methodology.
8. Pilot/test curriculum during the 2016-17 school year.
9. Revise the curriculum based on evaluation, feedback and the pilot programs.
10. Finalize the curriculum for implementation.
11. Finalize and prepare documents for production.

The City will provide:

- Compensation to GIAC in the form of an operational grant of \$50,000.
- Timely review and feedback on all updates and deliverables.

It is Mutually Agreed:

That the working relationship will be defined to include lines of communications with appropriate staff.

That GIAC reserves the right to expend funds as needed to meet grant agreement and overhead costs.

That all parties will review quality of service and address concerns as they arise.

That this working agreement may be amended at any time by mutual written agreement of the parties. In addition, either party may terminate this agreement by providing the other party with thirty (30) days written notice.

SIGNATURES

The below signatures certify consent on the above agreement.

GRANGE INSURANCE AUDUBON CENTER

Signature	Title	Date
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CITY OF COLUMBUS

Signature	Title	Date
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